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THE
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A
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OF
NATURAL HISTORY.

CONDUCTED BY
EDWARD NEWMAN, F.L.S., F.Z.S.,
MEMB. IMP. L.-C. ACAD.

SECOND SERIES.—VOLUME THE EIGHTH.

(OR THIRTY-FIRST FROM THE COMMENCEMENT.)



LONDON:
JOHN VAN VOORST, 1, PATERNOSTER ROW.

M.DCCC.LXXIII.

The charms that mind delights to trace
Are those that glow in Nature's face,
The only beauties that withstand
The touch of Time's destroying hand.

I love thee, Nature, as a child
Loves the dear mother that beguiled
Its many tedious hours of pain,
And soothed it into health again.

I love thee on the mountain wild,
The verdant valley, or the mild
Cool margin of some silvery stream,
Whose waters in the sunlight gleam.

I love at noon the twilight shade
The gently waving trees have made—
To sit, and let my spirit roam
And visit Nature in her home.

* * * * *

I'll never, Nature, bid farewell
To thee; thou in my brain shalt dwell,
Till mind shall have outgrown its clay,
And left its garment to decay.

J. W. D.

PREFACE.

SIXTEEN YEARS have elapsed since anything like a Preface has appeared in an annual volume of the 'Zoologist': sixteen years! it is a considerable portion of a life! During that period the parent work, that from which the 'Zoologist' descended, has been revived, and has met with unparalleled success.

'THE ENTOMOLOGIST' was projected and commenced in October, 1840, the first number being published on the 1st of November of that year. The First Volume, consisting of twenty-six sixpenny numbers, was completed on the 1st of December, 1842, with the following announcement:—

"'The Entomologist,' under its present title, will now cease; but the spirit of the work, more particularly as regards those brief but highly interesting communications which my correspondents have from time to time contributed to the chapter intituled Varieties, will be continued in the pages of the 'Zoologist.'"

This combination existed for twenty years, during which the 'Zoologist' gradually increased in bulk until it could no longer suffice for the requirements of all branches of Zoology, and a periodical exclusively entomological became a manifest necessity.

As a matter of course, the abstraction of the entomological matter from the pages of the 'Zoologist' impoverished that journal to a considerable extent; it was a competing line under the same direction; apparently a suicidal measure; an absurdity: the result, however, has not been altogether unsatisfactory. Although the contributors and subscribers to the 'Zoologist' have slightly decreased, those to the 'Entomologist,' during the eight years of its renewed lease of life, have increased fourfold and are still increasing; and thus a multitude of young and energetic naturalists have been actually called into existence.

It cannot and need not be concealed that the circulation of the 'Zoologist' has also been diminished by its opposition to the seductive and popular hypothesis of Evolution so ably and unceasingly advocated by Mr. Darwin and his followers. Nothing, I admit, is gained by this

opposition; however adverse appear the speculations of the Evolutionist to the narrower views and aspirations of the Factist, and however strenuous the advocacy of either, no advocate will convince his opponent of error, yet will always remain in the enjoyment of his own views. It might be relevant, as an addendum to this allusion to a prevalent belief, to complain of the persecution the 'Zoologist' has suffered, as it were, "for conscience sake," but "the querulous" can never be "the dignified,"—can never command respect; and it is a satisfaction to know that in all ages of the world persecution has been the weapon of error, and has always failed to accomplish its object, the suppression of truth.

Then with regard to the value of communications published during the present year, there is no ground for regret. Passing by the vast amount of reliable facts communicated in shorter notices, the longer contributions of Mr. Balkwill on system, Mr. Cordeaux on the birds of Lincolnshire, Rev. A. E. Eaton on Spitsbergen, Dr. Gray on British Cetacea, Mr. Harting on British Heronries, Mr. Gervase Mathew on flying fish, Mr. Potts on the night parrot of New Zealand, with very many others, must ever be regarded as permanent additions to the store of zoological knowledge.

The publication during the present year of Dr. Wyville Thomson's narrative of the dredging cruises of H.M.S.S. 'Lightning' and 'Porcupine' must be regarded as developing a most important era in zoological science: this work will not only be regarded as a vast revelation of fact,—though in this respect it stands almost unrivalled,—but it will also serve to dissipate a large amount of speculation and error, and will all but inaugurate a new science; it may be said to have ploughed, and ploughed deeply, a field of Zoology far more productive than any that had been previously tilled: there seems no limit to the additions which this phase of discovery will make to our knowledge of Zoology, and it teaches, moreover, that many of those creatures hitherto supposed to be extinct, are still living on to gladden the eyes of the truth-seeker and reward his perseverance: it shows that "finality" in Science is a dream, the dream of the indolent, and that the best knowledge is that which shows us how little we know.

EDWARD NEWMAN.

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THE ZOOLOGIST

FOR

1873.

Notices of New Books.

Notes on the Birds of Damara Land and the Adjacent Countries of South-Western Africa. By the late CHARLES JOHN ANDERSSON. Arranged and Edited by JOHN HENRY GURNEY. London: Van Voorst. 1872. Demy 8vo, 394 pp. letter-press, three outline litho. plates and a map.

THE Birds of Africa—but before I say anything of her birds I must say a word or two of Africa herself, and yet another subject intervenes and takes precedence even of Africa herself. I mean the maps: the first step towards an intelligible appreciation of Africa would be the publication of entirely new maps, in which all rivers, lakes, mountains and cities, the site of which is either absolutely fictitious or in the slightest degree suppositious, should be entirely obliterated. Wherever the surveyor has laid down a single feature, whether natural or artificial, the Suez Canal or the Table Mountain at the Cape, every jot and tittle of his work should be religiously preserved. With these subtractions and additions we should have a map which to the sincere truth-seeker would be an inestimable boon: we may perhaps hope that our remote posterity may enjoy such a boon; we of the present generation certainly shall not. At present we content ourselves with Africa as depicted by the historian from very flimsy materials, or by the poet who, after the method of his craft, has drawn largely on his imagination. From the historian and the poet, as illustrated by modern travellers, we find evidence sufficient to convince the most sceptical of philosophers that the

human race in Africa, after attaining the highest state of so-called civilization as attested by architecture, evidence that cannot be gainsaid, has yielded gradually and grudgingly to the inevitable process of decay to which every unit, family or nation must sooner or later succumb, and that Nature, after Copt, Moor, Arab, Kelt and Teuton have contested the soil with her inch by inch, has conquered them all and promises to reign supreme from the Mediterranean to the Cape. The Sphinx—riddle or wreck, defying or deriding the mutilations of time, Kelt and Teuton—is yielding to the silent advance of sand; the elephant, once the submissive slave of Hanno and Hannibal, has thrown off the yoke of man and ranges at liberty through the length and breadth of the land. I am aware there is what may be called a fringe of civilization all round her seaboard; but we must contemplate the land-marks set up thousands of years ago, if we would understand and appreciate what is meant by "*her ancient civilization*," and we must watch year by year the progress of the sand around the architectural splendours of Karnac and Edfou to understand the irresistible yet silent strength which Nature is exerting to regain her own. The most gigantic and successful enterprise of modern times, an enterprise so vast that the sober-minded believed it impossible, is but the faint echo, the diluted copy of a labour accomplished centuries on centuries before, a labour which Nature had in her irresistible persistency determined to obliterate. Africa is now the paradise of the naturalist, the paradise of the beasts and the birds he delights to seek and to study.

The Birds of Africa—but I must keep them waiting yet a moment longer, for the Nile, that problem and puzzle of all historical generations, has not yet been so much as mentioned, and the Nile was the cherished mystery of my boyhood: twenty years before I can recollect, James Bruce had issued his four ponderous volumes, which, to take his own valuation, were "the most magnificent present in that line ever made by a subject to a sovereign." In 1815 Mungo Park's second journey was published by Wishaw, and attracted a great deal of attention, and I was old enough to feel jealous of a reputation which seemed an interference with that of the magnificent Bruce: my school Geography, a very humble volume divided into numbered paragraphs, and bound in smooth red leather without lettering or ornamentation of any kind, assured me that "the source of the Nile was finally settled on the 14th of

November, 1770, by James Bruce, a Scottish gentleman of independent property and a lineal descendant of the kings of Scotland:” and it added, by way of parenthesis, “In Egypt it never rains.” I believed both. I was jealous of Mungo Park. I thought his was an undue interference with my Scottish hero; but as time wore on I read of other discoveries of these Nile sources by the Portuguese and by Jesuits in their zeal for propagandism; and I read of Nile discoveries thousands of years before the Portuguese were a nation or the Jesuits a Society, and I have lived to an era when the “final settlement” of Bruce is forgotten and when discoveries of the source of the Nile are common. Familiarity begets contempt, and we now read in the columns of the ‘Times’ the announcement of these discoveries with just as much interest as the birth of a hippopotamus in the Zoological Gardens. In fact, Africa has become a “curiosity,” and now that an Englishman has settled himself comfortably in the interior, and an American has shown how easy it is to visit him, we may reasonably expect that Mr. Cook will annually lead a company of fashionable *ennuiés* to “knock and ring” at the door of the voluntary exile, and that a “Month at Ujiji” will become as familiar an expression as a “Summer in Norway” or a “Winter in Rome.” The only questions for solution and the only matters for wonderment will be, “How did Livingstone conceal himself for so long a period? Why did he not communicate with his friends? Why have we Englishmen who professed so warm an interest in his safety been allowed to receive no intelligence of his whereabouts?”

The Birds of Africa—could they appreciate their advantages—ought to consider themselves particularly fortunate in the number and ability of their historians. Andersson, Burchell, Chapman, Des Murs, Finsch, Gurney, Hartlaub, Layard, Levillant, Müller, Rüppell, Sharpe, Shelley, Andrew Smith, A. C. Smith, Swainson, Tristram, Van Heuglin, Waterhouse, and many others, have each contributed a chapter to the general stock of African bird-lore, not only to their own honour but to the great advantage of Science. Although I do not contemplate going through this long list alphabetically, I will begin with the first.

Charles John Andersson, a Swede by birth, was educated at the public high school in Wenersborg, and was afterwards a student in the University of Lund for a single term: he does not seem to have studied deeply or to have attained any proficiency in literature; his

taste led him in rather an opposite direction,—hunting and travel,—and from his own statement it appears his aspirations were, at a very early period, turned towards Africa. At the age of twenty-two this aspiration became a settled purpose, and he came to England in 1849, and sold some specimens of Natural History, living and dead, in order to raise the necessary funds. In this very year Livingstone made his journey to Lake N'gami by way of the great Kalahari Desert, and found that to the north of South-Western Africa was a well-watered country abounding in animal and vegetable life. This discovery roused the enthusiasm of young Andersson and many others, more especially Francis Galton, who volunteered to bear Andersson's expenses as well as to keep him company in an expedition similar to that which Livingstone had made with so much success. Andersson and Galton sailed from England in April, 1850, and reached the Cape of Good Hope in the following August. Their first expedition into the interior was from Walwitsh Bay, and appears to have been undertaken with the object of purchasing oxen trained as well to the saddle as the yoke. In this, on the very threshold of their Natural-History campaign, they had a taste of the ordinary concomitants of a wandering life in South-Western Africa—burning heat, extreme thirst, attacks by lions, which either devoured their horses and cattle or drove them to a distance from the encampment. On their return from this experimental trip Andersson had his first personal encounter with the king of beasts: he had lodged a ball in the lion's body; aware that he was hit, yet by no means disabled, the lion turned about and faced his enemy, who dropped on one knee preparing to give him the second barrel. The lion made his spring, but passed clean over his opponent, leaving him unscathed. A few moments afterwards the lion was found dead near the spot: the first ball had been enough for him.

After many wearisome and irksome delays, their final start for Lake N'gami was made in March, 1851, and in May they reached Ovampo; and made a stay of six weeks, during which Andersson made his observations on the country and its inhabitants, and shortly after Galton succumbed to the toil and troubles of the journey, the obstructions of the natives, the disabled state of the oxen and wagons, and determined on taking the first opportunity of returning to Europe.

After a fatiguing journey, the travellers arrived at Tunobis on the 3rd of October, and here for the first time Andersson became

fully aware of the richness of Africa. Here he found wild animals innumerable; with two companions he bagged thirty rhinoceros, and afterwards, when quite alone, eight others fell to his rifle, besides other large game. Galton took with him to England about five hundred bird-skins, the whole of Andersson's collection, and Andersson took up the project which Galton had abandoned of penetrating to Lake N'gami in company with Hans Larsen, a Dane, a hunter of the first order, possessing a perfect knowledge of the country, herculean strength and an iron constitution. This toilsome journey was relieved by adventures more sensational than any that have been served up to us by what are called the ladies' novels of the period. I will make a few extracts.

Lying in Ambush.—"At Kobis, one of the nearest stations to N'gami, Andersson had, he himself tells us, his surfeit of shooting. On this and many other occasions he adopted a system of hunting that in South-west Africa, during the dry season, is especially successful, namely, to lie in ambush at night near to some pool. During the daytime the larger animals are dispersed over a wide tract of country, sometimes of many miles in extent, but at night they resort to the water to quench their thirst; and if at such times the hunter knows his business, he has the opportunity of obtaining much large game. These night-haunts, however, are attended with greater peril than those by day. Andersson was accustomed to ensconce himself in a so-called skärm or screen, that is, a small circular enclosure, six or eight feet in diameter, the walls usually consisting of loose stones, being about two feet in height; but this afforded him scarcely any protection, and he must, besides, if he would count on a sure shot, allow the beast to approach to within a few paces before firing. We believe that the hunter is never so unprotected against savage animals as in such nocturnal combats. Andersson, indeed, on the first night of his stay in Kobis, was, on three several occasions, in imminent peril of his life. First came an elephant, without his being aware of his approach, and with lowered trunk stood directly over him: that he could save himself as he did, by throwing himself backwards on the ground and discharging his piece upwards at random, is what could only happen once in a thousand times. A while afterwards, he shot at and wounded a black rhinoceros; and when subsequently he left the skärm to look after another of those animals he had fired at and struck, he was fiercely attacked by the first rhinoceros, cast headlong to the earth, and had his right thigh ripped up. Lastly, when at sunrise, he attempted to aid his boy, Kamapyu, who, whilst searching for his master, was attacked by the same beast, Andersson again escaped death, as by a miracle: for just as he was on the point of being impaled on its sharp horn, the rhinoceros fell dead from its numerous wounds."—P. ix.

Almost in the following page we find an account of an evening call, which terminated in a manner perfectly satisfactory to the visitor, and relieved the visitor from the necessity of complaining of his reception.

An Evening Call after Bed-time.—"This little expedition was not without its sporting result. One night he chanced to fall asleep in his skärm, when his mind became impressed with a confused sense of danger: whilst between sleeping and waking, he could not make out the nature of the peril; but on coming fully to himself, he distinctly heard the breathing of an animal immediately near his place of concealment, and a sound somewhat resembling the purring of a cat. A lion had crept close up to him as quietly as possible, but still not unnoticed by his dangerous neighbour. Andersson seized his gun, which was lying ready close by his side, aimed at the dark heap before him, and fired. The beast's roarings and convulsive movements showed plainly that the ball had told. It was not, however, until daylight, that Andersson ventured forth from his skärm to ascertain the effect of his shot; when he found, to his great satisfaction, the lion lying dead at no great distance."—P. xii.

Returning for a moment to lying in ambush, I think it is impossible not to differ from our traveller as to the advantages of studying Nature in a moonlight ambush.

Moonlight Ambush.—"A moonlight ambush by a pool, well frequented by wild animals, is worth all the other modes of enjoying a gun put together. In the first place there is something mysterious and thrilling in finding oneself the secret and unsuspected spectator of the wild movements, habits and propensities of the denizens of Nature's varied and wonderful menagerie,—no high feeding, no barred gates, no harsh and cruel keeper's voice having yet enervated, damped or destroyed the elasticity, buoyancy and frolicsomeness of animal life. And then the intense excitement between each expected arrival! The distant footstep, now heard distinctly rattling over a rugged surface, now gently vibrating on the strained ear as it treads on softer ground: it may be that of a small antelope or an elephant, of a wild boar or a rhinoceros, of a gnu or a giraffe, of a jackal or a lion. And then what opportunities present themselves of observing the habits and peculiarities of each species, and even of individuals; to say nothing of the terrible battles that take place, and can so rarely be witnessed in the day-time. I have certainly learnt more of the untamed life of savage beasts in a single night's *tableau vivant* than during months of toilsome wanderings in the broad light of the sun."—P. xv.

I fear some critic will exclaim that these paragraphs are very unornithological; but how can I help this? the author has written

them, his able Editor has reproduced them, and I have enjoyed them: why, then, should I hesitate to reprint them for the delectation of my readers? But I must bid adieu to this warfare between the aggressor and the aborigines, only observing that I fail to see the advantage of making so heavy a bag of rhinoceros. I have more than once been asked the question, when butterfly hunting in the Herefordshire woods, "Are they good to eat?" I would fain ask the rhinoceros-hunter who slays these cumbersome brutes in this wholesale manner, "Are they good to eat?" but it were to no purpose: he has removed to a country whence no answer is returned. Andersson's career, however, is far from being one of indiscriminate slaughter. He paid great attention to Natural History for its own sake, especially to the nesting and migration of birds—attention which is only possible for one who is almost a resident: the continuous observations necessary for this are denied to the hasty traveller who passes rapidly from site to site, from ocean to ocean, well knowing that hereafter he will see each no more: we are, therefore, especially indebted to a man who has devoted his time and talents to such observations as those which follow. The connection of insect-life with migration, a subject misunderstood or overlooked by our earlier naturalists, is simply and clearly set before us in an admirable passage which cannot be studied too attentively by our rising ornithologists.

Breeding Season.—"The pairing and breeding season of birds in Damara, Namaqua, and parts adjacent, depends much, if not entirely, on the falling of the rains; that is, the breeding season is late or early according to late or early rains. From November to May is probably the chief period of incubation; but very many birds pair as early as September: owls, bee-eaters and grouse are amongst the earliest breeders. Near the sea-coast, or rather those portions of it where the periodical rivers have their embouchures, the breeding season is somewhat different, or, perhaps it would be more correct to say, occurs later in the year. The cause is simple: rain rarely or never falls in those parts; and it is not until long after the rivers (having their sources and origin in the distant interior) have subsided, that the scanty vegetation recovers from its 'torpor;' and with it returns the insect-life, which enables the parent birds to seek and obtain suitable sustenance for their tender broods. The moulting season begins with the return of the wet season. It is during the rainy time of the year that the greatest variety of birds is to be observed; for, though all but deserts during the dry season, Damara and Namaqua Land, from their peculiar positions, &c., are then a regular paradise to the feathered tribes, the insect- and reptile-life being at

that period exceedingly prolific. Swarms of migratory hawks and kites may then be observed in pursuit of the myriads of Termites which at this season infest the air, but at the same time brighten it, as it were, with innumerable silvery dots and streaks, as their gorgeous wings and white bodies encounter the fiery sunlight. Here and there a flock of storks may be observed busily chasing the devastating locusts, or performing graceful gyrations in the air ; and whilst the temporary rain-pools often abound with rare and handsome water-fowl, the shores are frequented by the elegant heron, the lively sand-piper, the graceful avocet, and the gorgeous flamingo. The Atlantic on the west, the Orange River to the south, the Okavango River, and the Lake N'gami, with the watersheds to the north and east, contribute chiefly to these large and varied annual incursions and migrations."—P. xxix.

It will be seen that all these passages are from the introductory portion of the work : I now proceed to the systematic part, in which the species are treated *seriatim*, and shall make a few more extracts before I close the book : the quotations are all from the earlier part of the volume, and these give a better and more impartial view than had I culled the sensational only ; indeed those who seek this element in Natural History will I trust be satisfied with the personal adventures already selected from the Introduction. It is impossible to read the selections which follow without perceiving that the writer was as careful and guarded in his conclusions as he was diligent and untiring in observing. The readers of the 'Zoologist' will be sure to recollect the once-attractive controversy between Waterton and certain American ornithologists on the question whether in its search for carrion the vulture is led by the eye or by the nose. Waterton's admirable papers read as fresh as when they were written, but one feels it impossible to go with him in all his conclusions. It is difficult to believe that if the vulture is led by scent alone, he would indulge in those aerial gyrations which have attracted the notice of all travellers : when distance has reduced him to a mere speck in the sky, a mote in the sunbeam, he will infallibly descend to a carcass from which life has even recently departed ; the scent of the dead animal could scarcely ascend to those upper regions of air : there must have been the exercise of a second sense, and most probably that of sight. Waterton's great talent for sarcasm often amuses without convincing, and we are willing to enjoy his satire when we fail to see the force of his reasoning : Andersson graphically records his experience, and leaves his readers at liberty to draw their own conclusions. The manner in which his vultures followed each other reminds one of

the conduct of hounds when one has given tongue: it is no longer necessary that each should hit the scent; with the majority it becomes a game of "follow the leader."

Led by the Nose.—"I believe naturalists are not quite agreed as to whether vultures hunt by sight, by scent, or by both faculties combined. I have myself no doubt that they employ the one sense as well as the other in finding their prey, though I feel inclined to give sight the preference; and I had once a very striking proof of how they employ their vision in guiding them to carrion,—in this instance, however, not so much by the actual sight of the carrion (though the first discovery probably originated in that way) as by another singular contrivance. Early one morning—as I was toiling up the ascent of a somewhat elevated ridge of hills, with the view of obtaining bearings for my travelling-map, and before arriving at the summit—I observed several vultures descending near me; but thinking I had merely disturbed them from their lofty perch, I did not take any particular notice of their appearance, as the event was one of usual occurrence; but on gaining my destination I found that the birds were not coming merely from the hill-summit, but from an indefinite distance on the other side. This circumstance, coupled with the recollection that I had wounded a zebra on the preceding day, in the direction towards which the vultures were winging their way, caused me to pay more attention. The flight of the vultures was low, at least five hundred to a thousand feet below the summit of the mountain; and on arriving near the base they would abruptly rise, without deviating from their direct course; and no sooner was the obstacle in their way thus surmounted than they again depressed their flight. Those vultures which I saw could not have themselves seen the carrion, but simply hunted in direct sight of one another. There was a numerous arrival; and although I could not always detect the next bird, as soon as I lost sight of the previous one, yet, when at length it did come into view, it never seemed uncertain about its course. Having finished my observations I descended, and proceeded in the direction which the vultures had pursued; and after about half an hour's rapid walking, I found, as I anticipated, the carcase of a zebra, with a numerous company of vultures busily discussing it."—P. 3.

The next passage, treating of the numbers of a hawk which is of excessive rarity in this country, would exceed all belief, but for the strictly trustworthy character of the writer. One is lost in wonder in endeavouring to solve the question, "Where can such a host of birds of prey find food?" But the solution appears simple when we hear it: they feed exclusively, or nearly so, on white ants and locusts, and the supply of both these insects is inexhaustible.

Abundance of Falco vespertinus.—"This pretty falcon strongly resembles the hobby, both in form and habits, but is much more numerous. It usually arrives in Damara and Great Namaqua Land about the rainy season, and again retires northwards upon the approach of the dry season. During these annual visits it is exceedingly abundant, and may be counted by hundreds and by thousands; nay, their numbers at times exceed all belief. On one particular occasion a friend of mine and myself attempted to form a rough approximation to the number of these birds actually within sight, and of the black- and yellow-billed kites, with which they appeared to be mixed up in about equal proportions. Taking a small section of the sky, we came to the conclusion, by counting and estimating, that there were at least ten thousand individuals; and, as the heavens above and all around us appeared to be darkened by a living mass of kites and hawks, we set down the aggregate number, immediately within our view, at fifty thousand, feeling at the same time that we were probably below the mark."—P. 15.

Still more remarkable than these multitudes of hawks, is the discovery of a bird of prey (*Machæramphus Anderssoni* of Gurney) which feeds exclusively on bats.

Hawk Feeding on Bats.—"On the 10th March, 1865, I obtained one specimen, a female, of this singular bird, at Objimbinque, Damara Land. It was shot by my servant, who observed another,—probably the male: I imagine that I have myself observed it once or twice in the neighbourhood of Objimbinque just before dusk. When brought to me, I instinctively suspected the bird to be a feeder at dusk or at night, and called out: "Why, that fellow is likely to feed on bats!" And, truly enough, so it turned out; for on dissection an undigested bat was found in the stomach. And in another specimen, subsequently killed by Axel, there were several bats in the stomach."—P. 23.

We now arrive at a bird whose figure and character are familiar to every ornithologist, although he may not have made acquaintance with the living bird. The existence of such birds as the secretary and the çariame seem to me exactly the link required to support my view of the arrangement of birds, in which I proposed to make the gymnogenous Grallæ follow the Accipitres. One always likes to find a support to a favourite crotchet, even though it be no stronger than a reed; but neither our Author nor his Editor alludes to that *quæstio vexata*—the natural arrangement of birds: and the pen-and-ink sketch I am about to cite has a different merit and attraction: it is from the life.

Le Mangeur de Serpents.—"The secretary bird is found sparingly in Great Namaqua and Damara Land, and on the plains of Ondonga in the

Ovampo country: it also occurs about Lake Ngami. It spends most of its time upon the ground, rarely, if ever, taking to the wing; and if compelled to do so, it is only for very short flights, as it seems to prefer seeking its safety by means of its long legs, which are admirably adapted for running. Its swiftness is wonderful, and it actually seems to skim the ground when briskly pursued; sometimes, however, this confidence in its legs costs the bird its life, when the well-mounted horseman, aware of its terrestrial propensities, steadily pursues it, until it becomes too much exhausted to avail itself of its wings, and ultimately falls a prey to its enemy. When undisturbed it usually stalks about with considerable ease, grace, and dignity; but it is difficult to approach, as its long legs and neck, and its habit of frequenting open and exposed localities, enable it to espy an enemy at a great distance, and thus to guard against any sudden surprise. When seen making steadily for a particular point, it may sometimes be successfully cut off by pressing forward rapidly across its path, as on such occasions, instead of deviating from its straight course, it trusts to its legs for outstripping its pursuer by holding on at all risks,—in this respect resembling the ostrich. The food of the secretary bird is very various, consisting of snakes, lizards, tortoises, mice, rats, insects of almost every kind, and even young birds; but these latter, I believe, it only devours when distressed by hunger; for amongst the old Dutch colonists it was frequently kept in captivity as an excellent mediator in the poultry-yard, as well as a protector to the young fowls from the attacks of snakes, rats, &c. Many snakes show fight when attacked by the secretary bird; and it is a most amusing and ludicrous sight to witness a combat between such different opponents; the bird, however, invariably comes off victorious, after a short but desperate resistance: the reptile hisses and darts at the secretary, which not only skilfully wards off the attack, but, by a rapid succession of violent blows from its formidably-armed wings, generally succeeds in a short time in prostrating its wily enemy; and sometimes a well-directed blow on the vertebræ of the snake at once ends the combat. As soon as this is accomplished the bird dexterously seizes its fallen enemy in its bill, and, after having well tossed it backwards and forwards, finally puts an end to the death-struggle by transfixing the brain with its powerful beak.”—P. 34.

One more quotation, and I have done; too happy if I have succeeded in inducing others to purchase a work that has been so amusing and instructive to myself. I cannot close the volume without bearing my testimony to the skill and thoroughness with which the Editor has performed his part of the task. It is fitting that an energetic and enterprising man, like Andersson, should have such a monument built to his memory by so able an architect as Mr. Gurney.

A Climbing Hoopoe (*Irrisor erythrorhynchus*).—"It lives in small flocks, probably consisting of entire families which frequent trees, chiefly of the larger kinds, and examine them most assiduously in search of insects and their larvæ, which they extract from crevices in the wood and from beneath the bark. These birds climb like woodpeckers, and their long tails come into constant contact with the rough surface of the trees, by which the tail-feathers are much injured. When they have finished their examination of one tree, they move to the next convenient one; but not all together, as a short interval generally elapses after the departure of each individual. The moment flight is decided on, they utter harsh discordant cries or chatterings, which are continued until they are safely lodged in their new quarters: these harsh notes are also heard when they conceive themselves in danger from either man, beast, or bird; and they thus often betray their presence."—P. 65.

EDWARD NEWMAN.

The Chinese Stag lately at the Zoological Gardens.

[The interest excited by the arrival, residence and death of the Chinese stag at the Zoological Gardens in Regent's Park justifies the reprinting of the very elaborate description and details respecting him which appeared in the 'Transactions of the Zoological Society' for 1871. It is from the pen of the talented Secretary, Mr. Selater, and forms part of a valuable paper "On certain Species of Deer now or lately living in the Society's Menagerie." The death of this stag, from acute inflammation of the intestines, was announced in the September number of the 'Zoologist,' and nothing remains for us but to regret a loss which we cannot suppose will be readily repaired. It gives one rather an exalted idea of those Emperors of China, who maintained hundreds, or probably thousands, of these noble animals expressly for the chase.—*Edward Newman.*]

THIS fine animal is one of the many zoological discoveries which are due to the researches of M. le Père Armand David, Missionary of the Congregation of Lazarists at Pekin, an active correspondent of the Museum of Natural History of the Jardin des Plantes, and a Correspondent Member of this Society. M. David first made known the existence of this deer in 1865, in a letter addressed to Professor Milne-Edwards, having become acquainted with it by looking over the wall of the Imperial Hunting Park, in which it is kept in a semi-domestic state. This park is situated about two miles south of Pekin, and is called the Nan-hai-tsze, or "Southern Marsh." No

European is allowed to enter it. It is stated to contain deer of different species, and herds of *Antilope gutturosa*, besides the *Elaphures*. M. David saw from the wall more than a hundred of the last-named animal, which he describes as resembling a "long-tailed reindeer with very large horns." At that time he was unable, in spite of every effort, to get specimens of it; but, being acquainted with some of the Tartar soldiers who mounted guard in the park, subsequently succeeded in obtaining the examples upon which M. Alphonse Milne-Edwards founded his description of this remarkable animal. Shortly after this M. Henri de Bellonet, Chargé d'Affaires of the French Legation at Pekin, managed to procure a pair of *Elaphures* from the Imperial Park, and kept them for nearly two years in a court near the Embassy in that city. Upon his return to Paris, in the summer of 1867, M. de Bellonet, having heard of our applications to our correspondents at Pekin to obtain living examples of this animal, was kind enough to place this pair at the disposal of the Society upon our undertaking the expense of their removal to this country. This the Council willingly agreed to, and application was at once made to H. E. Sir Rutherford Alcock and our other correspondents at Pekin to make arrangements for their transport. Unfortunately, however, these animals died before this could be effected; but the skin and skeleton of the male were carefully preserved under Sir Rutherford Alcock's directions, and forwarded to the Society along with two pairs of the shed horns of the same animal. They were exhibited at our meeting on November 12, 1868, after which the skin was deposited in the British Museum and the skeleton and horns in the Museum of the Royal College of Surgeons. Meanwhile Sir Rutherford Alcock lost no time in making application to the Chinese authorities for other specimens, and, after interviews with Prince Kung and other high officials, ultimately succeeded in procuring several young pairs, one of which reached the Society's Gardens in perfect health and condition on the 2nd of August last. The general aspects of the *Elaphure* is much more like that of the true *Cervi* than I had anticipated from the description and figure of M. Milne-Edwards. The only two very noticeable points of distinction, besides the horns of the male, which are not at present shown in our animals, are the rather larger and heavier legs, the longer and more expanding toes, and the long tail. The latter character, however, seems to me to have been somewhat exaggerated

in M. Milne-Edward's figures, the tail in our specimen not nearly reaching the hocks, and, though of somewhat different form, being really little, if any, longer than that of the fallow deer and some of the American deer (such as *Cervus virginianus*). The muffle of *Elaphurus*, as M. Milne-Edwards has already stated, is quite naked and moist, as in the true *Cervi*. The lachrymal sinus is small, and the eye also remarkably small. The muzzle is terminated by a good many straggling bristles, as in *C. Duvaucelli*. The insides of the ears in this deer are very closely filled with dense hairs. I cannot ascertain positively whether the usual gland on the outer side of the metatarsus is present or not in this deer; but it is certainly not very highly developed. On the whole, I find no character to take this species out of the genus *Cervus* as I think it ought to be understood. The *Elaphure* is no doubt very distinct in the form of its horns from any other described species of the genus, and should be placed in a section by itself, just as *Rusa*, *Axis*, *Hyelaphus*, and the numerous other (so-called) genera of some authors. Those who regard these subordinate groups as generic will likewise use *Elaphurus* as a genus. To me its nearest ally seems to be perhaps the *Barasingha* (*C. duvaucelli*), which has likewise a long muzzle terminated with outstanding hairs, and rather long expanding toes. Like the *Barasingha*, the *Elaphure* is in all probability an inhabitant of marshes and wet grounds. Mr. Swinhoe informs me that the young *Cervus Davidianus* is spotted with white like other true *Cervi* at its birth, and retains the spotted dress about three months, when these markings gradually disappear.

Ornithological Notes from Norfolk.

By HENRY STEVENSON, and J. H. GURNEY, jun., Esqrs.

(Continued from Zool. S. S. 3320.)

OCTOBER.

Redlegged Partridge.—A young redlegged partridge, with white or whitish wings, was shot near here on the 7th, but being unfortunately absent when it was brought to my house I did not see it.—G.

Marsh Harrier.—An immature male, with yellow head, was shot at Hickling on the 12th. (See Gunn, Zool. S. S. 3323.)

Gannet.—Several were shot off Yarmouth during the early part of the month.—G.

Great Gray Shrike.—A male was shot at Burgh, near Yarmouth, on the 23rd. (See Zool. S. S. 3323.)

Pomatorhine Skua.—Three seen off Yarmouth on the 8th.—G.

Mealy Redpoll.—An adult male, with rosy breast and rich carmine patch on the head, was netted at Yarmouth on the 8th, with common linnets. This species has not been seen by our bird-catchers for several winters.

Teal.—On the 10th one was found in the village, dead, from no apparent cause, and where one would have least expected such a bird.—G.

Redthroated Diver.—A fine example, with the red throat of the summer plumage still perfect, and only a few white feathers showing in the region of the eyes and bill, was brought to Norwich on the 8th. This bird was in such a state of moult that it could not have flown, having shed all its old primary quills, and the new ones being too short for use.

Gray Phalarope.—One seen on the 12th at Yarmouth, swimming in the breakers, just off the south denes.—G.

Storm Petrel.—Three specimens were sent to Norwich for preservation on the 2nd; and on the 12th a quantity were seen by Mr. Preston, outside the Scroby sand, at Yarmouth.—G.

Peregrine.—On the 17th the keeper saw a peregrine.—G.

Blackbird.—On the 19th a handsome pied blackbird was sent to Mr. Gunn from Weston.—G.

Quail.—A single bird was sent to Norwich, to be stuffed, in the last week of this month.

Jackdaw.—On the 24th I saw a pied jackdaw in the flesh, at Mr. Cole's, and was informed that it had been in confinement eighteen years.—G.

Partridges attracted by Gas-lights.—On the 24th five English partridges flew violently against the back of a house in Davey Place, close to the Norwich market. It was getting dusk at the time, about half-past five in the afternoon. These birds, most likely flushed outside the city, were evidently attracted by gas-lights in a room at the back of the house, and dashed, both against the window and wall, with force enough to stun themselves. They fell on a lean-to roof beneath, from whence two were taken in a landing-net, one recovered and flew away, and two, scrambling

into the yard below, were also captured. Not the least remarkable part of the story is the fact of their choosing a bird-stuffer's house for this rash act.

Swift.—I saw the last swift at Thorpe market on the 3rd.—*G*.

Little Bittern.—On the 15th a little bittern was shot near Bungay, by Mr. Mann.—*G*.

Cromer Lighthouse.—On the 4th a willow wren and about twenty sky larks flew against the lighthouse. Also the keeper caught an owl, which may either have been attracted by the light, or by the larks, which were fluttering against the light. On the 5th a goldcrest; wind N.E. On the 7th a starling and two thrushes; W.S.W., cloudy and misty. The former was killed, the latter got away. Many birds strike the glass, but have strength left to get away: on the 10th a jack snipe, which had done so I have no doubt, was picked up in a garden at the foot of the hill on which the lighthouse stands. On the 20th two goldcrests—S.W., fog; their gizzards were empty, as if they had come off a long voyage—and a very good immature ring ouzel. On the 24th, a wren and a robin; S.S.W. On the 28th, a chaffinch; W.S.W., gloomy.—*G*.

Shoreler Duck.—A young female, no doubt bred in this county, was sent up to Norwich during the first week of this month.

Autumn Migrants.—On the 7th, gray crows were seen off Cromer, by a gentleman who was fishing at sea. The same day they were first seen off Yarmouth, where some settled on the paddle-box of a steamer, exhausted with their long flight; and hundreds of rooks, and larks, and starlings, together with a few jackdaws and three tree sparrows, were observed about twenty miles from the shore, the wind being from the east, all bent on the same errand,—the accomplishment of the great autumnal migration. On the 11th, the same observer writes that there was a check in the migratory tide:—"No small birds crossing, only a few rooks; I suppose they knew of the gale of wind that was coming on; I saw two drowned rooks about twenty miles from the land." But on the 14th, being again at sea from 4 A.M. until 8 P.M., he saw more:—"There were rooks, gray crows, starlings, larks, chaffinches, and tree sparrows, crossing, but the day being fine they did not seem tired; and the only birds that came to rest on board were a few tree sparrows." I am well aware that this species will not unfrequently alight on vessels in the North Sea, and occasionally in great flocks.—*G*.

Catalogue of the Whales and Dolphins (Cetacea) inhabiting or incidentally visiting the Seas surrounding the British Islands.
By Dr. J. E. GRAY, F.R.S., &c.

THE study of the cetaceous animals of these islands has been gradually improving, and although I believe we have much to learn, yet we have a better knowledge of them than of the whales of any other country; no doubt this is partly owing to our insular position. The accounts of these animals in our British Faunas are mere compilations, and Dr. Fleming is the only author of such a work who appears to have seen a British whale in the flesh. Turton, in 1807, indicates eighteen species, which are reduced by Fleming (in 1828) to sixteen, and by Jenyns (in 1835) and Bell (in 1837) to fourteen species, the latter regarding three or four specimens which had been treated as distinct species by other authors, as a single species, without any more reason than his predecessors had had for separating them. In the 'Annals and Magazine of Natural History' for 1846 (xvii. p. 82) I gave a list of the British Cetacea, containing seventeen species, which I had the opportunity of personally examining, either entire or in osteological remains, sufficient to enable me to determine them. In this paper I record for the first time as British, *Megaptera longimana* (erroneously printed "*longipinna*"), *Lagenorhynchus albirostris*, and *Grampus Cuvierii*, considering it and *Delphinus Rissoanus* and *D. griseus* as the same species. In the 'Proceedings of the Zoological Society' for 1847 (p. 117) I published some additional observations on the "*Cetacea of the British Islands*," in which I pointed out how the skeleton of Dr. Knox's *Balæna maxima-borealis* differed from that of *Physalus Antiquorum*, and should be called *Physalus borealis*, which Prof. Turner has lately shown is the same as *P. Sibbaldii*. In the 'Proceedings of the Zoological Society' for 1864 I published a paper on the "*Cetacea which have been observed in the Seas surrounding the British Islands*," in which I attempted to condense all the original matter in the various works on the British whales and dolphins and the results of my examination of all the specimens I could collect. In this paper I described thirty species, belonging to twenty genera, and illustrated it with figures of the more characteristic bones. More lately Professors Flower, Turner and Burmeister have paid much attention to the anatomy of these animals.

The French and Belgian naturalists are very far behind in the knowledge of these animals, as is proved by the names of the plates in the '*Ostéographie de Cétacés*,' and especially by the text of the '*Whalebone Whales*,' by M. Van Beneden, which is the only part of the text printed. M. Eschricht did some good work on the common arctic whales, but he wanted specimens, and was very fond of theoretical speculations from very few materials. Lillejeborg, in the '*Nova Acta Upsal.*' (1867), described all the Swedish whales, translating the British Museum Catalogue of Cetacea, as far as it regards the Swedish species, and making additions to it; Prof. Malm, in the *Konigl. Svensk. Akad. Handl.*' (ix. 1870) has described all the specimens of Cetacea and their bones which are in the Swedish Museums: he uses the '*Catalogue of Cetacea in the British Museum*' as the basis of his work, and describing some new species and figuring them, and specimens of parts not before described or figured; and they certainly are the two best foreign authors on this subject. I think this shows that the English zoologists hold a good place among the students of Cetacea.

It may be observed that the number of Cetacea found in England is much greater than those recorded on the Continent; thus Nilsson, in his *Scandinavian Fauna*, only enumerates sixteen, and Schlegel, in his '*Fauna of Holland*,' only ten species, against the English thirty; but no doubt this arises from their having been more industriously collected and carefully observed in this country. Since 1864 I have examined many specimens and their skeletons, and been able to define the characters of the genera and species more accurately and to obtain more knowledge of their geographical distribution; by this means I have increased the number of species to thirty-three.

Whales and dolphins chiefly live and exclusively breed in sheltered bays and in shallow waters on the shores or over raised banks in the ocean. The deep ocean appears to be a barrier which only stragglers pass, a circumstance entirely overlooked by M. Van Beneden, in his '*Geographical Distribution of Whalebone Whales*,' who believes that each species inhabits a defined belt across the ocean. The species which inhabit and chiefly breed in the Arctic Seas migrate southwards, some individuals keeping to the eastern or European, and others to the western or American hemisphere, so that some species of these whales are found on the shores of both Europe and America. The species that live and breed in the

Mediterranean, when they pass out of the Straits of Gibraltar, do not at once cross the Atlantic Ocean, as they ought, according to Van Beneden's theory, but naturally, with their desire to keep to the shore, come north and keep along the coasts of Portugal, Spain and France, until they reach the south coast of England, where the greater number have been observed. Some of them pass to the east and up the German Ocean, and others to the west coasts of Great Britain and Ireland, some even reaching the northern end of the gulf-stream. This explains how *Petrorhynchus cavirostris*, bred in the Mediterranean, sometimes occurs at Shetland, and at others in the German Ocean.

I have used the names as in my Catalogues, and have only added a few synonyms, because they are given at length in my 'Catalogue of Seals and Whales in the British Museum' (8vo, 1866), with numerous figures in the text, and more modern ones in the 'Supplement to the Catalogue' (1871), which are sold at a very small price.

Order CETACEA.

Teeth all similar, conical, sometimes not developed, when the palate is furnished with transverse plates of baleen or whalebone. Body fish-shaped, smooth, bald. Limbs clawless; fore limbs fin-shaped; hinder united, forming a forked horizontal fin. Nostrils enlarged into blowers. Teats two inguinal. Carnivorous.

Section I. MYSTICETES (or Whalebone Whales).—Head large, depressed. Teeth rudimentary; they never cut the gums. Palate with transverse, fringed, horny plates of baleen. Nostrils separate, longitudinal. Gullet very contracted. Tympanic bones simple, large, cochleate, attached to an expanding periotic bone, which forms part of the skull.

The whalebone whales, or Mysticetes, inhabiting the northern hemisphere, live and breed essentially in the colder parts of it, and the southern parts of England seem to be the limits of their migration; and the great increase of traffic of ships, and especially steam vessels, on the more temperate parts of the sea, appears to restrict their visits, and especially their breeding, more to the arctic portion; thus some whales which were formerly said to be common on the coast of Britain, as the right whale, no longer visit this country.

The humpbacked whale (*Megaptera*), the razor-back (*Physalus Antiquorum*), and the pike whale (*Balænoptera rostrata*) perhaps

breed here in the quiet bays; at any rate, they visit this country almost every year, the two latter following the herrings and perhaps the mackerel, and often ascending the large rivers, the pike whale having been found as high up the Thames as London Bridge. Perhaps the great northern rorqual (*Cuvierius Sibbaldi*) and the broad-beaked rorqual (*Rudolphi* *laticeps*) have the same habit as the razor-back, but they have not been so often seen. It is not so easy to know the geographical distribution of the gigantic flat-back (*Sibbaldius borealis*), which has only occurred twice, once in the southern parts of the Southern Ocean, and again on the south part of England. It has never been recorded as found in the North Sea, and therefore one is not sure what is its native locality, but one may make certain that an animal upwards of a hundred feet long does not breed in the much-disturbed German Ocean. The skeleton of the adult specimen was exhibited in London, Paris, and other European capitals, then in America, from whence it migrated to the Crimea, and it is now in the Museum at St. Petersburg. A skeleton seen by so many persons in all countries, and figured several times, still remains unique, whereas if it had occurred elsewhere it would have attracted attention. Unfortunately, the young specimen at Charmouth appears to be lost; it is said to have left that place to come to London, but I have not been able to trace it further, or to verify the idea that it is the same as the one shown at Charing Cross or a species allied to it.

Sub-order I. BALÆNOIDEA.

Head large. Body stout. Dorsal fin none. Chest and belly smooth, without plaits. Pectoral fin broad, truncated; fingers five, graduated. Arm-bones very short, thick; radius and humerus of equal length. Baleen elongate, slender. Tympanic bones rhombic. Cervical vertebræ united.

Family I. BALÆNIDÆ (Right Whales).—Head very large, and body short. Dorsal fin none. Belly smooth. Baleen elongate, slender. Vertebræ of the neck anchylosed. Pectoral fin broad, truncated at the end; fingers five. Tympanic bone rhombic; maxillary bones narrow.

i. BALÆNA.—Baleen thin, polished with a thick enamel on each side, and a fine elongate slender fringe. Cervical vertebræ united by their bodies into one mass.

1. *Balæna mysticetus* (Right Whale).—Inhabits North Seas; Greenland; said formerly to have been an occasional visitor. Peterhead, 1682; *Sibbald*. Zetland; *Barclay*. Skeleton from Greenland (Mus. Roy. Coll. Surg.) and dried fœtus (Mus. Hull and Liverpool).

2. *Balæna britannica*. *Balæna mysticetus*, var., Gray, Cat. Seals and Whales, 1866, p. 83, fig. 3 (cervical vertebræ), copied as *Balæna biscayensis*, Van Beneden, Ostéog. Cetac. t. vii. fig. 7. *MacLeayius britannicus*, Gray, Ann. and Mag. Nat. Hist., 1870, vi. pp. 198 and 204; Suppl. Cat. Seals and Whales, p. 46.—Inhabits British Channel. Cervical vertebræ, dredged up at Lyme Regis, in the British Museum.

The British Museum has just received a skeleton of *MacLeayius australiensis*, which shows that there is a very great difference between its cervical vertebræ and that of *M. britannicus* from Lyme Regis, which has caused me to make it into a different genus.

Sub-order II. BALÆNOPTERIDEA.

Head moderate. Body elongate. Dorsal fin distinct, rarely wanting. Belly longitudinally plaited, rarely smooth. Baleen short, broad. Maxillary bones broad. Pectoral fin lanceolate; arms elongate; radius and ulna much longer than the humerus. Fingers four, subequal. Vertebræ of the neck free or partially united. Tympanic bones oblong or ovate.

Family I. MEGAPTERIDÆ (Humpbacked Whales).—Dorsal fin low, broad. Pectoral fin very long, with four very long fingers of many phalanges. Vertebræ 50 or 60. Cervical vertebræ often anchylosed. Lateral process of the axis rarely ossified. Neural canal large, high, triangular. Ribs 14 or 15.

i. MEGAPTERA.—Blade-bone without acromion or coracoid process. Body of cervical vertebræ subcircular.

1. *Megaptera longimana* (The Humpback). Inhabits North Sea. Newcastle; *Johnston*. Fœtus from Greenland (Brit. Mus.) *Var. Morei*, Gray, l. c., p. 122. Inhabits estuary of the Dee. 1863; *J. More*. Skeleton of female (Free Museum, Liverpool).

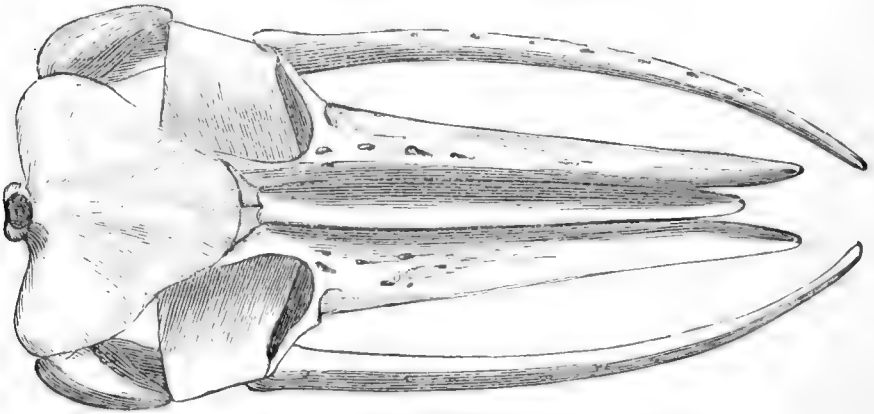
ii. ESCHRICHTIUS.—Blade-bone with large coracoid process. Body of cervical vertebræ separate, small, roundish oblong. The neural canal very broad and high.—Gray, Cat. Seals and Whales, 1866, p. 132, f. 21 (bones).

1. *Eschrichtius robustus* (Gräsö Whale). Inhabits North Sea. Skeleton found buried in Denmark (Lillejeborg). Coast of Devonshire (fifth vertebra cast ashore, Babbicomb Bay, 1861); *Pengelly* (cast in Brit. Mus.). Not observed in a living state, and may be extinct, like several other whales the remains of which are found in the alluvian deposits of Holland and Belgium.

Family II. PHYSALIDÆ (Finner Whales).—Dorsal fin high, erect, compressed, falcate, about three-fourths of the entire length from the nose. Pectoral fin moderate, with four short fingers of four or six phalanges. Vertebrae 55 or 64. Cervical vertebrae not ankylosed. Neural canal oblong transverse.

* *Vertebrae 60 to 64. First rib single ended.*

? i. *BENEDENIA*.—Rostrum of skull narrow, attenuated, with straight slanting edges. Second cervical vertebra with two short truncated lateral processes. The first rib single-headed.



BENEDENIA KNOXII (skull in the British Museum).

1. *Benedenia Knoxii*. Inhabits North Sea. Coast of Wales (1846, 38 feet long); perhaps the young of *Balænoptera Antiquorum*, as I first described it.

ii. *PHYSALUS*.—Rostrum of the skull narrow, attenuated, with straight sloping sides. Second cervical vertebra with a broad lateral process, with a large perforation at the base. Lateral rings as long as the diameter of the body of the vertebra. First rib single-headed. Sternum trifoliate, with a long slender hind process. Fingers shorter than the fore-arm bones. Scapula very broad; acromion and coracoid process well developed.

1. *Physalus Antiquorum* (Razor-back), Flower, P. Z. S., 1869, p. 604, pl. 47 (male). Ribs 14—14.—Inhabits North Sea. Visits the British seas annually. Coast of Hampshire, 1842. Plymouth, 1831 (skeleton Brit. Mus.); 1863 (skeleton Alexandra Park). Length 60 to 70 feet. I took Eschricht to see the skeleton cast ashore at Blackgang Chine in 1842, to try to convince him that it was different from the finner whales.

2. *Physalus Duggeridii* (Orkney Whale), Heddle, P. Z. S., 1836, p. 187, f. 44, 45. Gray, Cat. Seals and Whales, p. 158, figs. 33—35.—Inhabits North Sea. Orkneys; *Heddle*. Cervical and dorsal vertebræ and baleen in Brit. Mus. Length 50 feet.

iii. CUVIERIUS.—Rostrum of the skull broad, the outer sides arched, especially in front. The second cervical vertebra with two short thick lateral processes. First rib single-headed. Sternum oblong-ovate, transverse. Hands elongate; fingers slender; second finger much longer than the fore-arm bone. Scapula with a broad acromion and rudimentary coracoid.

1. *Cuvierius Sibbaldii* (Great Northern Rorqual), Knox, Jardine's Library, t. vi. *B. borealis*, Gray. *C. latirostris*, Flower, P. Z. S., 1864, p. 410; Gray, l. c., p. 165. *Physalus Sibbaldii*, Gray, l. c., 110, fig. 36. *Balænoptera Sibbaldii*, Van Beneden, Ostéog. Cetac. t. xii. and xiii. fig. 25 to 34. *B. Carolinæ*, Malm, t. 44.—Inhabits North Sea. North Berwick, 1831; *Knox* (skeleton in Mus. Edinburgh). Humber (skeleton of young, 50 feet long, in Mus. Hull). Londonderry; *Turner*. In 1847 I had the opportunity of examining the skeleton of a large male whale, 78 feet long, which Dr. Knox described as *Balæna maxima-borealis*, then suspended in the Zoological Gardens, Edinburgh, and pointed out its difference from the skeleton of *Physalus Antiquorum*, and proposed to call it *P. borealis* (P. Z. S. 1847, p. 117). Professor Turner, who has lately had the opportunity of examining the skeleton more closely, says it is the same as *Cuvierius Sibbaldii*.

** *Vertebræ* 58—60. *First and second ribs double-headed; second cervical vertebra with a broad lateral process perforated at the base. Lower jaw compressed with distinct coronoid process.*

iv. RUDOLPHIUS.—Dorsal fin compressed falcate, two-thirds the entire length from the nose. Ribs 13—13; first rib short, dilated at the external end. Sternum elongate, not narrow at the posterior

lobe. Fingers elongate, the second finger rather shorter than the fore-arm bone. Scapula very broad, with a large broad acromion process and a moderate coracoid one.

1. *Rudolphius laticeps* (Broad-beaked Rorqual), Gray, Synopsis Whales and Dolphins, p. 3. *Sibbaldius laticeps*, Gray, l. c., p. 170, figs. 37, 38 (skull and ribs).—Inhabits North Sea between Holland and England. Skeleton Mus. Berlin (31 feet long) and Leyden.

v. *SIBBALDIUS*.—Dorsal fin very small, far behind, and placed on a thick prominence. Ribs 14—14; first short sternal end very broad and deeply notched. Sternum trifoliate, with a short broad hinder lobe. Scapula broad, with very long acromion and short slender coracoid process. Fingers —?

1. *Sibbaldius borealis* (Flat-back). *Balenoptera boops*, Yarrell, P. Z. S., 1840, p. 11. *B. tenuirostris*, Sweeting, Mag. Nat. Hist. 1840, iv. p. 342.—Inhabits German Ocean between Belgium and England; 1827 (skeleton now at St. Petersburg, 102 feet long). British Channel, Charmouth, Dorsetshire, 1840 (female 41 feet long).

Family III. *BALENOPTERIDÆ* (Pike Whales).—Dorsal fin high, erect, compressed about two-thirds of the entire length from the nose. Pectoral fin moderate, with four short fingers. Vertebrae 50; cervical vertebrae sometimes anchylosed. Neural canal broad, trigonal. Ribs 11—11. The second cervical vertebra with a broad lateral expansion, perforated at the base. First rib single-headed. Lower jaw with a conical coronoid process.

i. *BALENOPTERA*.—The lower lateral processes of the third to the seventh cervical vertebrae with an angular projection on the lower edge. Fingers short, the length of the fore-arm bone. Scapula broad; acromion and coracoid elongate, slender.

1. *Balenoptera rostrata* (Pike Whale). *Balena minor*, Knox. —Inhabits North Sea, ascending rivers. Thames, common; Humber, &c. Stuffed specimen (British Museum). This species is at once known by its small size, and the large white patch on the upper surface at the base of the pectoral fin.

J. E. GRAY.

(To be continued.)

An American Fossil Lion.—Professor Leidy has described a new species of lion, under the name of *Felis augustus*, from fragments of teeth and jaws found in Nebraska. It is about the size of a large tiger.

Otters near Plymouth.—Not long since a large otter was seen close to an enclosed pool kept as a store-pond for marine animals intended for the Crystal Palace Aquarium. Otters are not at all uncommon among the rocks in Plymouth Sound, and I well remember watching one with a telescope for a quarter of an hour as it was fishing in the sea quite fifty yards from the shore. It swam about in a kind of circle, constantly diving just like a cormorant, and bringing up a fish almost every time, which if small was eaten in the water, but if large was brought to a rock and there devoured; then the otter would again swim off and fish as before. During the quarter of an hour I saw it catch no less than twelve fish. About a week since a friend of mine went to inspect a wreck lying on the rocks in Mount Batten Bay, when he observed some boys pelting something with stones, and on going to see what it was, he found that they had killed one otter and another was at the last gasp. As they were fine animals he purchased them both and had them stuffed. No doubt the surf, during the late tremendous gales, had driven them from hiding-places among the rocks.—*John Gatcombe; 8, Lower Durnford Street, Stonehouse, Plymouth, December 6, 1872.*

Bats flying at Noon.—Within the last fortnight I have, on five different days, observed a short-eared bat flying between the hours of 11 A.M. and 1.30 P.M. in the bright sunshine, catching insects with the greatest ease, and bold enough to come within a yard of my head. I tried several times to knock it down when coming towards me, but it always swerved quickly to one side. The first time I saw a bat fly in the sunshine was on the 18th of March last year at noon. I have noticed that the days were all mild, and each time there was a continuous rain during the preceding night. In future I shall consider the expression “blind as a bat” to mean quickness of sight.—*J. Sclater; Castle Eden Castle, Durham, November 7, 1872.*

[Other instances have repeatedly been recorded in the ‘Zoologist.’—*E. N.*]

Birth of a Rhinoceros in London.—This unprecedented event occurred in the London Docks on the evening of the 6th of December, and we learn the following particulars from the obliging keeper Mr. John Warnken. The two animals, mother and child, are the property of Mr. Rice, naturalist, of Grove Street, Commercial Road. The mother was taken in a pitfall, and was shipped, with a male of the same species, from Singapore, in the steamship “Orchis.” The ship encountered such heavy seas on the voyage that the strong teak cage of the male was broken in, and the occupant was either killed or died from injuries received. After a passage of seventy-three days, the vessel arrived in the Victoria Docks, and before the survivor could be removed from deck she gave birth to this young one. The period of gestation, hitherto unknown, has, we believe, now been ascertained to be nine months. Mr. Bartlett, of the Zoological Gardens, was at once sent for, and under his superintendence the “little stranger” was removed in blankets.

to Mr. Rice's premises. The mother soon afterwards arrived in a van, and the young one was fed with her milk. This is the only nourishment it takes; but it is so strong and vigorous that it applies to the mother repeatedly, and the keeper (who sleeps all night with it) informed us that it had sucked no less than seven times during the night previous to our visit. Descending some steps into a dark stable, we could see by the dim light of a bull's-eye lantern that the further end had been partitioned off, and covered with sacking to exclude the light. In this compartment the old rhinoceros was lying down, while the young one, pretty strong on its legs, was walking slowly towards us, and making for a square opening that led into a separate chamber in which a feather-bed had been placed for its especial benefit. The opening through which it entered is too small to admit the mother, although the keeper, who shares its feather-bed, informed us that the dam comes to the opening and looks in affectionately at her infant while it sleeps. She is very quiet, and seems little to think that with one toss of her strong and sharp horn she could send cradle and keeper through the roof of the stable. As we peeped in at a small aperture, the keeper holding the light down for us, the young one walked up deliberately to the lantern, and gave us an excellent view. In appearance it reminds one of the young hippopotamus, but has a longer head, and apparently stands higher on its legs. The face is bare, with just a rudiment of horn, but the body is covered with black hair. The ears are long and directed backwards, although occasionally twitched perpendicularly with a quasi-nervous movement.—*Correspondent of the 'Field.'*

[The species to which this interesting mother and child belong is supposed to be *R. sumatranus*, but there has been such stumbling about the name of the two-horned species of Asiatic rhinoceros, that I think it best to say little on this head.—*Edward Newman.*]

The Young Hippopotamus.—This inmate of the "Zoo" continues in good health and grows rapidly.

The Channel Islands Fauna.—The question of what islands should be included as British Islands, in treating of their productions in making collections, either zoological or botanical, is more complicated than at first sight would appear. The term "United Kingdom of Great Britain and Ireland" excludes the Isle of Man, which is as much a dependency as the Channel Islands and Heligoland. But the Isle of Man, geographically, should certainly be included, and the Channel Islands and Heligoland excluded. On the other hand, the Orkneys and Shetlands should certainly be included, both geographically and politically, beyond a doubt, and the Faroe Islands would certainly be included were it not for their political separation. The latter, geographically, belong to the same series as the other islands in the North of Scotland, the only difference being that the

Kings of Norway and Denmark have long ago given up the Shetlands; the latter retains the Færoes, but I apprehend that if he followed the same course with the latter isles all naturalists would have no choice but to include them. The whole question is a satire on making collections in districts politically united, which do not include the whole of the group of islands geographically, but on the other hand include districts that geographically belong to other countries, the Channel Islands being strictly French islands and the island of Heligoland strictly German. I may observe that some of the Channel Islands, the Chansee Archipelago, for instance, are French both geographically and politically. Could the English Channel Islands be included and the French excluded?—*J. Jenner Weir.*

The Channel Islands Fauna.—In reading with interest the discussion in the pages of the 'Zoologist' as to the propriety of including the birds of the Channel Islands in the British list, I notice that a strong contrast is drawn between the treatment accorded to the Flora and the Fauna of these islands, apparently in forgetfulness of the fact that by conchologists (land and marine), and I believe also by the students of most branches of marine Zoology, the inhabitants of the Channel Islands have long since been "annexed" to the British Fauna.—*Henry T. Mennell; London, December 9, 1872.*

The Channel Islands Fauna.—I am glad you have given your approval to the proposition that the Channel Islands should be included in the Fauna of the United Kingdom. I am sure that a great many naturalists who annually visit these islands will be pleased with this decision. The Channel Islands are not so rich in Lepidoptera as Mr. Birchall would lead us to suppose. They have been already well worked in this department by resident entomologists without any very grand results in the shape of new British species, although some of the rarer British species are of common occurrence. You are mistaken in giving Guernsey as a locality for *Daplidice*; it is a species which never occurs here, although tolerably common in Jersey; but even there they are not to be captured by the hundred.—*W. A. Luff; Mansell Street, Guernsey.*

Notes from Guernsey.—There have been very few birds about this autumn, except turnstones; these are very plentiful. The shags also are numerous. I saw, at Mr. Couch's, on the 7th of November, two shell parrots, in the flesh, which had been shot in the island: a flock of them has been seen: last year also several were shot: it is a pity they are not let alone, we might then have them even more frequently than now: I have not been able to ascertain if they breed here. The swallows left us very late; I noticed them collecting on the 17th of October, and they left between the 17th and 20th.—*C. B. Carey; Candie, Guernsey.*

Osprey at Hempstead.—During the first week of August the keeper at Hempstead shot at a large hawk as it flew off a tree. He could not mark where it went down, and it was spoiled when he found it. It proved to be

an osprey, and probably a male from its small size. We have two which were killed at Hempstead in 1827 and 1867. Of the first my father gives me the following note:—"It took a large perch from the decoy-pond, with which it settled on an adjacent post, on the top of which a steel trap was set, which caught it by one foot." The second has been recorded in the 'Zoologist' (S. S. 872), as having been shot on the 13th of June, but the date on the back of the case is May 26th. The keeper saw it about for some ten days before he caught it, and shot at it once ineffectually. It was trapped by the left leg, in the same manner, and nearly in the same place, as the other one, and a small fish lay beside it.—*J. H. Gurney, jun.; Northrepps, Norwich.*

Goshawk at Hampstead.—A few days ago Mr. Burton, of Wardour Street, Oxford Street, showed me a fine young male that was captured in Hampstead on the 3rd of September: it had been struck down by the blow of a stone or stick. From the beautiful state of the plumage, it does not seem to have been an escaped bird; but I noticed that the claws were rather worn: I think this is rarely the case with a truly wild bird. It would be interesting to know if any one has lost such a bird in the neighbourhood.—*Frederick Bond; 203, Adelaide Road, October 1, 1872.*

Waxwing in Hampshire.—Messrs. W. Hart & Son, naturalists, in Christchurch, have kindly informed me that a female waxwing was killed near the above-mentioned town, and brought to them, in the flesh, on the 23rd inst. The appearance of this beautiful species in this country is, I believe, considered to be the sign of a severe winter.—*A. von Hügel; Stonyhurst, Nov. 25, 1872.*

Late Nesting of Starlings.—On the 22nd of October a pair of old starlings were seen by two of our servants enticing their young ones out of a nest where they had already reared two broods. Their previous behaviour had aroused suspicions, both in myself and others, that they were again breeding. This has occurred about eleven miles from the instance recorded by my friend Mr. Corbin in the 'Zoologist' (S. S. 3313).—*H. W. W. Aubrey; Rectory, Hule, near Salisbury.*

Food of the Chough.—The stomach of a chough which I dissected a few days ago was, with the exception of a few small bits of quartz, exclusively filled with the remains of Coleoptera, especially of *Geotrupes stercorarius*. It seems extraordinary how a bird can at this time of the year manage to find such a quantity of insects. Of the above species alone I counted ten elytra, and there were many more of the smaller kinds of beetles, which I was unable to identify. The bird in question was killed at New Quay, in Cornwall, on the 22nd instant.—*A. von Hügel; November 25, 1872.*

Late Cuckoo.—On the 29th of September a fine young bird was captured in a garden in this road by a cat, and kindly sent up to me. I think I never saw any bird so covered with fat; it has, however, made a very good skin.—*F. Bond; Adelaide Road.*

Late Swallows.—I saw seven swallows here on the 29th of October; there were many more on the 25th. No martins had been visible for some time previous.—*John P. Thomasson; Bolton, Lancashire.*

Late Nesting of the Ring Dove.—On the 2nd of November a lad returned from one of the common pastures of this town with an old ring dove and a young nestling. It appears he had seen the old bird leave the nest, and, waiting its return, shot it with a catapult; he then climbed up to the nest and brought home the young one, which he is endeavouring to rear. It is well known that ring doves nest all the summer long, commencing early in the spring, and continuing to have young until October. I think the instance under notice later than usual, and perhaps worth mention.—*F. Boyes; Beverley.*

Heronry near Salisbury.—In addition to the heronries already reported, allow me to state that there is a small one, consisting, according to the keeper's account, of about five nests, in some fine beeches in Longford Park, the seat of Earl Radnor, near Salisbury. I have reason to think that this must have been lately established.—*H. W. W. Aubrey.*

Heronries in Denbighshire and Merionethshire.—Among the heronries mentioned in Mr. Harting's interesting list I do not notice the following, which I know to exist, *viz.*—One at Vorlas Hall, Denbighshire (Mr. Wynn Finch); one at Glyn Hall, Merionethshire (Mr. Ormsby Gore); and a few nests at Rug Hall, Merionethshire (The Hon. Charles Wynn).—*W. J. Kerr; Maesmor, Corwen, Denbighshire, North Wales.*

British Heronries.—Observing that Mr. Harting's recent list did not include a colony I had seen, in 1867, in Woolverston Park (Mr. Berners), on the (proper) right bank of the Orwell, I walked there, with a friend from Ipswich, last week, to look for the nests. After much inquiry,—evidently impressing the natives that we were a couple of escaped lunatics,—the gude-wife of the "Cat" Lodge informed us that it was two years since the last nest was built there. Disgusted at their continued persecution, by being shot at and robbed of their eggs, the birds had concluded to cross the river to Orwell Park, exactly opposite, where Colonel Tomline protects them from all annoyance. On the following day, by climbing the narrow slip of bank left between Orwell Park fencing and the river at high tide, we were enabled to count sixty to seventy nests: there may have been more out of view, but the park is not accessible to the public, and but little of it can be seen from the river-bank. Only a few herons were to be seen fishing in the pools left in the river at low water, though in summer time I have seen fifty or more between Ipswich and Harwich: they did not mind the steamer, and sometimes a sociable bird would keep the boat company close alongside for some distance.—*Henry F. Bailey; London, December 12, 1872.*

Heronries in East Yorkshire.—As Mr. Harting, in his interesting list of British heronries, expresses a desire for additional information respecting

them, I send you a few particulars concerning those in this district. Mr. Harting begins by naming one at Hutton Cranswick (Mr. Bethel). There is some obscurity about this. I see Yarrell says, "Hutton, near Beverley, the seat of Mr. Bethel": this is clearly a mistake, and I have been much puzzled to find out what place was meant. First, Mr. Bethel never had his seat at Hutton, the family seat of the Bethels having been for many generations at Rise, which anciently belonged to the noble family of Fauconberg; secondly, I cannot learn that any heronry ever existed at Hutton. I thought perhaps Watton might have been intended, as it is in the lordship of Mr. Bethel, but I have no knowledge of any heronry there. One is mentioned as formerly existing at Storkhill, with the addition, "hence the misnomer for the locality." I believe the heronry ceased to exist some eighty years ago, but I cannot think that our forefathers would be guilty of such a want of discrimination as to mistake a heron for a stork, and all the old records show that our ancestors were well acquainted with the heron. I find that "hill" is a modern addition, and that the place was formerly called "Stork." It is called "Estorch" in Domesday. In 1354 the bailiff of the Provost's Court seized and entered on a messuage at Stork, which was held by William de Wele, who had neglected to render the customary relief of so many eels and to perform other requisite services. In the following year Thomas Pople, son of John le Stork, paid to the provost four hundred eels for the resumption of his land at Stork. In the reign of Henry VI. the chaplain of the chantry of Hull Bridge had a messuage and six acres of meadow in "Stork field," and the chaplain of the chantry of Thearne had a house and garden at Stork. From all this it will be seen that the place has been called Stork from old time, and that there is really no misnomer at all. I will not hazard a conjecture that storks ever bred there; but I have great respect for old names, and looking at the fact that in years long since past Storkhill would be almost entirely surrounded by water, and the low-lying carrs which stretch for miles beyond it were little else than swamp and morass, it is by no means unlikely that storks may have rested on their migrations at Storkhill. Be that as it may, old names often recall to mind many pleasant recollections and associations, and I would not have our "Bustard's Nest" or our "Butterbump" Hall altered on any account; for I do not believe these localities have been named other than from the fact of bustards and bitterns breeding there; indeed, the places so called are to all appearances the very spots that would be chosen by the respective birds for such a purpose. The heronry at Scorbrough gradually decreased until about forty years ago, when the few remaining birds forsook the place, partly in consequence of the trees decaying. Of the one at Swanland, near Hull, I can gather no information, and though I doubt not herons formerly bred there, yet it must have been a great number of years ago. A heronry existed at Hotham, in this Riding, up to the year 1819, the nests being placed in large Scotch fir and ash trees, and persons are still

living who used to climb up to the nests to get the eggs. There was a large heronry in Sutton Wood, Sutton-upon-Derwent, a village about six miles from York; but the birds left from continued persecution, and have not bred there for some years: I am told there were nearly a hundred nests in 1860. One or two pairs have bred constantly in a wood called "Beswick Rush," about two miles from Scorbrough, up to 1870, when the keeper destroyed both old and young birds, supposing them to do injury to a trout stream. Herons also bred in a wood at Holme, on Spalding Moor, but ceased to do so about five years ago. There are doubtless many other places in the Riding where herons formerly have bred; but the only one that I can learn at present in existence is the one at Newton, near Malton, on the estate of Sir George Cholmley. I went over this last spring to see it, and there were not more than twenty or twenty-five nests; moreover, Sir George's keeper, who has lived there twenty-six years, informed me there never were many more nests, and that they have neither increased nor diminished during his recollection.

—*F. Boyes; Beverley.*

Rednecked Phalarope in East Yorkshire.—A very nice specimen of this graceful little bird was shot at Burlington, on the 14th of October last, by the gamekeeper to Sir H. Boynton, Bart., of Burton Agnes. I saw it at Mr. Richardson's, the birdstuffer, here, who informed me it was an immature male. The occurrence of the rednecked species is very unusual in this part of the country.—*Id.*

Wild Geese.—Large flocks of wild geese daily frequent the wolds, and I learn from several persons that in one flock, consisting of upwards of a hundred birds, there are two almost entirely white. These two birds have been noticed in different localities, but more frequently in one particular large field of oat-stubble, and my informants say they look quite white when on the ground.—*Id.*

Eider Duck at Christchurch.—A young male eider was killed on the 13th of December in Christchurch Harbour, Hants, and is now in my possession. The eider duck is, as might be expected, of very rare occurrence on the Hampshire coast, only two instances being mentioned by Mr. J. H. Gurney, jun., in a list of rare birds obtained by Mr. Hart in the vicinity of Christchurch (Zool. S. S. 1510), although it reaches as far back as the year 1857: these two birds were procured in October, 1864, and May, 1868. Mr. Rogers, naturalist, in Freshwater, Isle of Wight, showed me some time ago an adult female eider, which had been shot a few years ago off Alum Bay, in the same island.—*A. von Hügel; December 15, 1872.*

Sea Woodcock.—The length of time which has elapsed since you published in the 'Zoologist' (June, 1870) a few notes on my 'Birds of Marlborough,' will, I trust, defend me from the imputations of any one who might imagine me an indignant author enraged by the few words of adverse, though kindly meant, criticism, to which I now ask you to allow me to reply. You say, "The application of the local name 'sea woodcock' to the dabchick is

without doubt a copied mistake." May I assure you that the mistake, if it exists, is not a copied mistake. On the authority of my own observations, I placed it in the list of *local names*—*i. e.* of those names by which the bird is known in the district, a definition to which the name in question certainly answers. I have frequently heard it used by gamekeepers, by the local birdstuffers, and by other people of a similar class,—a fact in itself sufficient to prove it worthy a place amongst local names. I may mention the fact that the local printer of my book, on reading the anecdote given in connection with the name, exclaimed that he now understood the meaning of the jesting application to all Aldbourne men. It was, so at least says tradition, some of the wise men of that place who in ignorance first called a little grebe a "sea woodcock." I do not in the least mean to infer that the name is not applied to the godwits, but only that its Marlborough denotation is different; indeed, as the godwit is at Marlborough an unknown bird, it is not likely to have any name amongst the inhabitants of the district. The application which you point of this name to British fish, shell, and fowl, is certainly rather a strange coincidence.—*Everard F. Im Thurn; Oxford Union Society, November 8, 1872.*

Polish Swan.—I quite agree with Mr. Durnford (Zool. S. S. 3339) that gray feet and legs cannot be maintained as a specific difference in the so-called Polish swan (*Cygnus immutabilis*). I have seen some cygnets of the mute swan, at the swan "upping" time, with light gray feet and legs, and the same in two- or three-year old birds in their full white plumage.—*Henry Stevenson; Norwich, December 16, 1872.*

Slavonian Grebe and Great Black Woodpecker in Norfolk.—On the 2nd instant I procured, at Leadenhall Market, a good specimen of the Slavonian grebe, which had been sent up from Norfolk. It was a bird of this year, in the immature plumage. I was glad to hear that a great black woodpecker had been sent from the same county about a fortnight before. Perhaps the fortunate possessor of it will confirm this statement.—*W. Ogilvy; British Museum, December 9, 1872.*

A Recent Trilobite.—On the 12th of February, while dredging about forty leagues east of Cape Fico, Professor Agassiz found a crustacean with a great number of rings and three-lobed: it is named *Tomocharis Purceii*.

Proceedings of the Entomological Society.

November 4, 1872.—Prof. J. O. WESTWOOD, M.A., F.L.S., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'The Transactions of the Linnean Society of London,' vol. xxviii.

pt. 2; vol. xxix. pt. 1; Proceedings, Session 1871-72; Journal, No. 55; presented by the Society. 'Proceedings of the Royal Society,' Nos. 135, 136 and 137; by the Society. 'Proceedings of the Scientific Meetings of the Zoological Society of London,' 1872, pt. 1; by the Society. 'Bullettino della Società Entomologica Italiana,' iv. trim. 2 & 3; by the Society. 'Mittheilungen der Schweizerischen Entomologischen Gesellschaft,' vol. iii. No. 9; by the Society. 'Bulletin de la Société Impériale des Naturalistes de Moscou,' 1872, No. 1; by the Society. 'The Transactions of the Entomological Society of New South Wales,' vol. ii. pt. 4; by the Society. 'Annales de la Société Linnéenne de Lyon,' N. S. tome xviii.; by the Society. 'Annales de la Société d'Agriculture, Histoire Naturelle, et Arts utiles de Lyon,' 4e Série, tomes i. & ii.; by the Society. 'The Journal of the Quekett Microscopical Club,' No. 19; by the Club. 'The Canadian Naturalist,' Nos. 7, 8 and 9; by the Editor. 'L'Abeille, 1872,' livr. 8—12; 'Millière, Iconographie et Description de Chenilles et Lépidoptères inédits,' livr. 28 & 29; by J. W. Dunning, Esq. 'The Entomologist's Monthly Magazine,' for August—November; by the Editors. 'The Zoologist,' for July—November; by the Editor. 'Newman's Entomologist,' for July—November; by the Editor. 'Exotic Butterflies,' part 84; by W. W. Saunders, Esq. 'Lepidoptera Exotica,' part 14; 'Cistula Entomologica,' part 5; by E. W. Janson, Esq. 'On the Revision of the Tenebrionidæ of America north of Mexico'; 'Description of a new Pseudomorphâ from California, with Notes on the Pseudomorphidæ'; 'On Amphizoa insolens, *Leconte*'; 'Notes on the Zopheri of the United States'; 'Descriptions of new Genera and Species of Western Scarabæidæ, with Notes on others already known'; 'Catalogue of Coleoptera from South-Western Virginia'; 'New Species of Coleoptera from the Pacific District of the United States'; 'Synopsis of the Parnidæ of the United States'; 'Notes on some Genera of Coprophagous Scarabæidæ of the United States'; 'Contributions to the Coleopterology of the United States'; 'Descriptive Catalogue of the Species of *Nebria* and *Pelophila* of the United States'; 'On the Species of *Oodes* and allied Genera of the United States'; 'Description of the Species of *Aphodius* and *Dialytes* of the United States'; 'Descriptions of new Species of *Histeridæ* of the United States'; 'Synopsis of the Species of *Corphyra*, *Say*, of the United States'; 'Synopsis of *Aphodiini* of the United States'; 'Remarks on the Species of the Genus *Isomalus*, *Er.*, of the United States'; 'Descriptions of new Species of *Elatridæ* of the United States'; 'Descriptions of new Coleoptera of the United States, with Notes on known Species'; by the Author, G. H. Horn, M.D. 'Remarks on Synonyms of European Spiders,' No. 3; by the Author, T. Thorell. 'Monographie des Graphiptérides'; 'Essai Monographique sur le Genre *Abacetus*, *Dejean*'; 'Remarques sur le Catalogue de MM. de Harold et Gemminger'; 'Essai Monographique sur les Orthogoniens'; 'Essai Monographique sur les Drimostomides et les Cratocérides, et

Description d'un Genre nouveau de Morionides'; by the Author, Baron M. de Chaudoir. 'Matériaux pour une Faune Névroptérologique de l'Asie septentrionale,' par MM. de Sélys-Longchamps et MacLachlan; by the Authors. 'Matériaux pour la Faune Belge,' Deuxième Note, Myriapodes; by the Author, M. Félix Plateau. 'Sulla Fecondazione dell' Ape regina'; 'Esame Critico della Teorie sulla Partenogenesi delle Api'; by the Author, the Rev. Giotto Ulivi. 'Description d'un nouveau Papillon Fossile (*Satyrites Reynesii*), trouvé à Aix en Provence'; by the Author, S. H. Scudder, Esq. 'Phylloxera vastatrix in Portugal'; by the Author, Albert Müller, Esq. 'Observations on a Paper read by Mr. A. Bathgate before the Otago Institute, 11th January, 1870, "On the Lepidoptera of Otago,"' by R. W. Fereday, Corresponding Member of the Entomological Society of London; by the Author. 'A Classified Catalogue of the Lepidoptera of Canada'; by the Author, A. M. Rose, M.D. 'Report of the Entomologist and Curator of the Museum, Washington'; by the Author, Townend Glover. 'The Scottish Naturalist,' vol. i.; by the Editor, Dr. F. Buchanan White. 'Stettiner Entomologische Zeitung,' vol. xxxiii. Nos. 4—9; by the Society.

By purchase:—'Terminologia Entomologica. Nach dem neuesten Standpunkte dieser Wissenschaft bearbeitet von Julius Müller.' 'Opuscula Entomologica,' edidit C. G. Thomson; fasc. i.—iv.

Exhibitions, &c.

Mr. S. Stevens exhibited a *Pieris Daplidice* and six examples of *Argynnis Lathonia* taken by himself, last September, near Dover; also a dark variety of *Pieris napi*, which he took at Leenan, Co. Mayo; two varieties, one very fine and rich in colour, of *Pyrameis cardui*, and a black variety of *Callimorpha dominula* from Dover; and *Sesia asiliformis*, *Chœrocampa celerio*, and *Deilephila livornica* from Brighton.

Mr. F. Smith exhibited a very large collection of Formicidæ sent by Mr. Rothney from Calcutta. This was especially interesting, inasmuch as, in many cases, all the forms were present, these being often so dissimilar in appearance as to render it certain that if their history was not known they would be placed in separate genera; and this had actually occurred in at least one instance.

Mr. Smith also exhibited, and presented to the Society, the Minute Book of the Meetings of the Entomological Society existing in London from 1806 to 1822, in which were copied the minutes of the pre-existing Aurelian Society. This had been given to him by Dr. J. E. Gray.

The Meeting passed a special vote of thanks to Mr. Smith for this interesting donation to the Society's Library.

Mr. Butler exhibited a remarkably perfect impression of the wing of a fossil butterfly in the Stonesfield slate. It appeared to be most nearly allied to the now-existing South American genus *Caligo*.

Mr. Davis exhibited a large collection of beautifully preserved larvæ of various insects.

Prof. Westwood exhibited a collection of drawings of the transformations of Indian Lepidoptera (chiefly Heterocera), executed by Major Hunter.

Prof. Westwood further made some remarks on the habits of the common gnat. He had observed none in his house at Oxford till about July; but from then up to the present time there were swarms in certain rooms every night, making their presence known by flying to the lights. All were females, which sex alone is known to torment man by its bites. They were carefully destroyed each day; yet, although both doors and windows were closed, they were daily replaced by a fresh swarm, and he could only account for their presence by supposing they came down the chimneys.

A letter was read from the Secretary of the Haggerstone Entomological Society, inviting the Members to their annual exhibition of insects on the 14th and 15th inst.

Papers read, &c.

Mr. Müller read the following, and exhibited specimens of the beetle:—

“Notes on the Habits of Ozognathus cornutus, Lec.

“On his visit to Europe last year, Mr. Riley, the State Entomologist of Missouri, presented me with a large cynipideous, potato-shaped, polythalamous oak-gall, from California, which I exhibited to this Society on the 6th of November, 1871.

“Mr. Riley proposes the name of *Quercus californica* for this gall, which he thinks is undescribed, and specimens of which have been seen by Baron von Osten-Sacken and Mr. H. F. Bassett, the leading authorities on American Cynipidæ. The name which the maker of the gall will therefore have to bear will be *Cynips californica*.

“As the gall in question was riddled by numerous exit-holes, some larger ones (two millimètres in diameter) represented those of the Cynips, while several smaller round ones (one millimètre in diameter), betokened the escape of an insect of a different size. I left it lying on my mantelpiece until the 20th of May last, thinking that nothing further could be bred from it. In this I was agreeably disappointed, as in the morning of the said day a small hillock of yellowish worm-eaten dust underneath an opening in course of formation warned me that the gall was still tenanted by living creatures. Of course the specimen was at once consigned to a glass vessel, and thenceforward watched as often as convenient. In the evening of the same day I observed that the identical hole had assumed the neat circular shape of the smaller sized openings scattered over the surface of the gall, and that a small, black, shining beetle had made its appearance in the vessel. This Coleopteron, I have since been informed by Mr. Riley, to whom I sent two pairs, was first described by Leconte in the Proc. Acad.

Sci. Philad. 1859, p. 87, as *Anobium cornutum*, and subsequently (*Ibid*, Oct., 1865, p. 226) admitted into his genus *Ozognathus*; its present name is therefore *Ozognathus cornutus*, *Lec.* The author observes that "this interesting species was sent me by Mr. Andrew Murray, as having been hatched in great numbers from some galls sent from California." Mr. Riley informs me that the habits and transformations of the species have never been published, that from the identical specimen he gave me he obtained several specimens of the beetle before leaving for Europe in 1871, and that from another specimen of the same gall he has bred others since, and has notes and figures of the adolescent stages. Acting on Mr. Riley's suggestion, I give here the few notes I wrote down while watching the beetle and its companions of both sexes, which continued to appear almost daily from the 20th of May up to the 19th of June, 1872, when I counted in all six males and fifteen females. Their ways are entirely those of a true *Anobium*; they gnaw their neat exit-hole in the same laborious fashion, and often remain at its mouth for a while before quitting it for the first time. If frightened in any way they sham death by drawing up their legs and antennæ; left to themselves they readily take flight, both sexes being provided with ample wings. The lively, cornute males may be seen restlessly crawling over the gall, constantly investigating its woody polished surface by means of their antennæ, and ready to copulate with the females directly the latter have made their appearance. On such occasions a running match takes place between the contending males to get hold of the new comer, and the most resolute male, that is to say the individual which can stand perambulation the longest, effects its purpose. The relative position of the sexes is precisely the same as with *Anobium*; the male while mounted, strokes the sides of the elytra and the underlying lateral parts of the abdominal segments of the female with its quivering antennæ. The female carries her partner about while copulation lasts, and even takes wing successfully with her burden. By isolating some couples from their restless companions, I have ascertained that this act lasts seldom longer than an hour; in some instances I have seen the males quit their hold after less than half-an-hour. The impregnated females re-enter the gall for the evident purpose of oviposition, but I have not been able to make as yet sure of the latter point. I have observed females make their way rapidly towards the nearest aperture while still carrying their partners, the males being ruthlessly and forcibly deprived of their conjugal rights at the entrance of the burrows, the females dragging themselves into the openings in spite of the counter-efforts of the males, which had no choice but to drop off. I have not seen the males enter the burrows again after their first exit from them, but the females I have noticed to go in and reappear again, though not always through the same tunnel, but I recognized the individuals in question by minute white paint marks, which I had previously applied to

their elytra. Two of the beetles outlived a week, the males generally dying after having copulated once: the females seemed to be longer lived; one marked female remained in full vigour for ten days. Their 'frass' consisted of isolated brown snuff-like grains."

The Rev. R. P. Murray communicated the following notes:—

"On some Variations of Neuration observed in certain Papilionidæ."

"I beg to lay before the Society a few cases of aberrant neuration which I have lately observed in certain insects in my collection. They occur in four genera, *viz.*, Papilio, Parnassius, Thais, and Synchloë (Butler).

1°. Papilio Cloanthus. In all the specimens I possess (three) I find that the first subcostal nervure anastomoses with the costal nerve. This is also the case in 2°, Synchloë Mesentina, these insects thus resembling in this respect the genus Leptalis.

3° and 4°. Parnassius Apollo and Delias. I possess specimens of both these species in which the first and second subcostal nervures coalesce more or less completely. Sometimes the junction is complete; in other cases the veinlets again separate just before the end of the first subcostal.

5°. P. Clodias. In the only specimen of this insect which I possess (a female) there is, in the right-hand lower wing, a transverse nerve running from the first subcostal near its extremity towards the second, which, however, is not quite reached, though both nervures are angulated and drawn towards one another by the additional vein.

6°. Thais Polixena. In one of my specimens there is a distinct and well-formed prediscoidal cell in the hind wings: in two other cases this cell is faintly indicated. This would seem to be a case of reversion to a former type, and to indicate that Thais is comparatively a modern genus. Its nearest ally is of course Parnassius, but as it also seems to possess a true affinity with Zegris, and so with the Pierinæ, we may perhaps conclude that this last-named group is somewhat less ancient than the Papilioninæ. Before concluding I may be allowed to remark on the affinity between the genera Parnassius and Eurycus, as shown by the females of each being provided with a horny pouch. I have nowhere seen it stated that this appendage was formed by Eurycus, but the fact is probably well known."

Mr. Dunning read a "Note on Atropos and Clothilla, with reference to Mr. W. Arnold Lewis's strictures on Dr. Hagen."

After quoting at length the passage from pp. 54, 55, of Mr. Lewis's 'Discussion of the Law of Priority in Entomological Nomenclature, with Strictures on its Modern Application,' in which Dr. Hagen is said to have been guilty of "astonishing chicanery," and to have described in 1865 an insect as having leather-like winglets, 27-jointed antennæ, and with legs not thickened, which in 1861 he had described as having a bare back, 15-jointed antennæ, and thickened thighs, Mr. Dunning proceeded as follows:—

"The contention is that the *Atropos* of 1861 is the *Clothilla* of 1865. Let us see if this be correct. Linné described a certain insect under the name *Termes pulsatorium*, and subsequent authors unanimously regarded the Linnean name as designating a creature which for the present purpose may be sufficiently described by saying that it is wingless and has seventeen joints to its antennæ. In 1815 Leach founded the genus *Atropos*; and for fifty years the insect popularly known as the death-watch was known to entomologists as *Atropos pulsatoria*. When Dr. Hagen compiled his 'Synopsis of the British Psocidæ' (*Ent. Ann.* 1861, p. 17), it had not occurred to any one to doubt that this creature was the identical species which Linné described as *Termes pulsatorium*; accordingly we find that, at p. 21, Dr. Hagen gives the well-known insect as the *pulsatoria* of Linné and Stephens. In 1841 Prof. Westwood described another insect under the name *Clothilla studiosa*, a creature not absolutely wingless, but possessing two short leathery scales or winglets, and having twenty-seven joints to its antennæ. So that in Dr. Hagen's Synopsis of 1861 we have:—

Gen. <i>ATROPOS</i> .	Gen. <i>CLOTHILLA</i> .
Wings wanting. Antennæ with about 15 joints.	With leathery winglets. Antennæ with about 27 joints.
Sp. <i>A. pulsatoria</i> .	Sp. <i>C. studiosa</i> .

"Dr. Hagen's 'Synopsis of the Psocina without ocelli' (*Ent. Mo. Mag.* ii. 121) was published in 1865. By this time he had discovered that the Linnean description of *Termes pulsatorium* did not accord with the insect which had so long been known as *Atropos pulsatoria*, and had satisfied himself that Linné had before him the identical species which Westwood afterwards named *Clothilla studiosa*. That being so, Hagen applies the Linnean name *pulsatoria* to Westwood's *studiosa*: the insect which has hitherto been called *pulsatoria* (and which is the *pulsatoria* of most authors, though not of Linné) requires a new specific name, and the next oldest is found to be *divinatoria* of Müller's *Prodromus*, dating from 1776. So that in Dr. Hagen's Synopsis of 1865 we have:—

Gen. <i>ATROPOS</i> .	Gen. <i>CLOTHILLA</i> .
Without wings. Antennæ with 17 joints.	Wings rudimentary. Antennæ with 27 joints.
Sp. <i>A. divinatoria</i> . (Synon. <i>A. pulsatoria</i> , of authors, not of Linné).	Sp. <i>C. pulsatoria</i> . (Synon. <i>C. studiosa</i> , Westwood).

"That is to say, the insect which in 1861 was called *Atropos pulsatoria* was in 1865 called *Atropos divinatoria*; and the insect which in 1861 was called *Clothilla studiosa* was in 1865 called *Clothilla pulsatoria*. The specific names are changed, but the *Atropos* of 1861 is the *Atropos* of 1865,

and the Clothilla of 1861 is the Clothilla of 1865; and instead of 'the same insect being described by Dr. Hagen twice over, on two adjoining pages, with opposite structural characters,' the two descriptions refer to two different insects, whose opposite structural characters, and their consequent generic as well as specific distinctness, were fully recognized by Dr. Hagen in 1861 as in 1865.

"To this extent Mr. Lewis's criticism is well founded. Dr. Hagen in 1861 did describe Clothilla as having the 'legs not thickened,' whilst in 1865 he says of Clothilla 'femora dilated,' just as he says of Atropos 'femora dilated.' Now the dilatation of the femora in Atropos is very prominent; in Clothilla it is so slight as scarcely to deserve the name; the thickening or absence of thickening of the thighs is a patent distinction between the two genera; and I cannot but believe that there is an unfortunate omission of the negative in Ent. Mo. Mag. ii. 122, and that the description of Clothilla ought to have been 'femora *not* dilated,' in contradistinction to the 'femora dilated' of Atropos. So far from its being the fact, as suggested by Mr. Lewis, that the alteration from the description of 1861 was designedly made in order to admit the Linnean pulsatoria into Clothilla, Dr. Hagen's view is that the insect with the dilated femora is not the Linnean pulsatoria at all, but that the Linnean pulsatoria is Westwood's *studiosa*, with the legs not thickened."

After referring to another discrepancy between the descriptions of 1861 and 1865, not mentioned by Mr. Lewis—namely, that the "eyes yellowish" of *A. pulsatoria* in 1861 become "eyes black" in the description of *A. divinatoria* in 1865—and pointing out that the "eyes yellowish" was a mistake, perhaps taken (blindly) from the Linnean *oculi flavi*, Mr. Dunning observed that, though the synonymy was not given at length in Ent. Mo. Mag., vol. ii., Dr. Hagen did say in so many words that *A. divinatoria* "is *A. pulsatoria* of Westwood and authors" other than Linné, *i. e.* the *A. pulsatoria* of Ent. Ann. 1861, and that *C. pulsatoria* "is apparently the true *Termes pulsatorium* of Linné, *C. studiosa* of Westwood," *i. e.* the *C. studiosa* of Ent. Ann. 1861. Thus Dr. Hagen himself plainly pointed out which insect he intended by each description,—pointed out, in short, that, notwithstanding the change of the specific names, notwithstanding any variations in the descriptions, the Atropos and Clothilla of 1865 were respectively the Atropos and Clothilla of 1861. And if any doubt could still be felt on the subject, it would be removed by a perusal of Dr. Hagen's later papers in Stett. Ent. Zeit. 1866, pp. 188 and 233, and Verh. zool.-bot. Gesells. in Wien, 1866, p. 201.

The writer then proceeded to say that he was at a loss to conceive how Mr. Lewis could have fallen into the mistake of supposing that the Atropos of 1861 was the Clothilla of 1865. "The head and front of Dr. Hagen's offending is, that he has substituted another name for pulsatoria, that

(Atropos) pulsatoria has been superseded ; in other words, that the pulsatoria of 1865 is not the pulsatoria of 1861. Mr. Lewis's complaint has its foundation in the facts that the (Atropos) pulsatoria of 1861 is called (Atropos) divinatoria in 1865, and that the (Clothilla) pulsatoria of 1865 is not the (Atropos) pulsatoria of 1861. Yet we are told that the Atropos of 1861 is the Clothilla of 1865 ! If this were really so, the pulsatoria of 1865 would be the pulsatoria of 1861, Dr. Hagen would be calling by the Linnean name that which he is now satisfied is not the Linnean insect, and Mr. Lewis might have cited him as (in practice, if not in theory) a supporter of *Communis error* !"

In conclusion, Mr. Dunning remarked that he had purposely abstained from discussing the correctness of Dr. Hagen's determination of the Linnean species or the propriety of the change of nomenclature which Dr. Hagen introduced. His only object was to show that our Honorary Member, who was not present to defend himself, had not in fact done that which Mr. Lewis supposed him to have done.

New Part of the proposed General Catalogue of British Insects.

A further portion of this Catalogue, comprising the Chrysidiidæ, Ichneumonidæ, Braconidæ and Evanidæ, compiled by the Rev. T. A. Marshall, was on the table ; and remarks thereon, by Mr. Marshall, were read.

New Part of 'Transactions.'

Part iii. of the 'Transactions' for 1872, published in August, was on the table.—*R. M'L.*

Death of Mr. J. K. Lord.—With much regret we announce the death of Mr. John Keast Lord, the manager of the Brighton Aquarium. Mr. Lord some months ago, just before the aquarium was opened, had a severe stroke of paralysis, and was unable to take any active part in the ceremony, though he was present at the opening. Since then, though he recovered his faculties slowly, it was evident that his constitution was heavily shaken. A severe cold, taken about a fortnight since, confined him to the house, and he died at his residence at Dorset Gardens, Brighton, on Monday last. Mr. Lord was the author of two works, 'The Naturalist in Vancouver' and 'At Home in the Wilderness.'—*'Field'* of December 14th, 1872.

Death of Thomas Dix.—Thomas Dix, a well-known naturalist, and an occasional contributor to the 'Zoologist,' died at West Harling, Norfolk, on the 19th of November, in the forty-second year of his age, and was buried in the Ipswich Cemetery on the 25th. He was a man of the kindest disposition, and was beloved by all who knew him.—*Edward Newman.*

Notices of New Books.

A Handbook to the Birds of Egypt. By G. E. SHELLEY, F.G.S., Z.S., &c. London: Van Voorst, Paternoster Row. 1872. 342 pp. Royal 8vo; fourteen coloured litho. plates.

I HAVE refrained from everything like criticism of the arrangement and names adopted by Mr. Harting and Mr. Gurney; and I shall follow the same course with Mr. Shelley's labours: still it must not be understood that the absence of criticism implies approbation; it simply indicates that I am wearied of the ungracious task of objecting to that tide of "change" which seems to pervade every work on Ornithology. As well might one attempt to stem the torrent of a mighty river by casting in a pebble-stone, as hope to arrest the prevailing fashion, whether that fashion be the shape of a bonnet or the name of a bird or a butterfly. The love of change inherent in man and woman is a guarantee for the ephemeral duration of all changes: nevertheless, without raising any objections, it seems desirable to give some idea of Mr. Shelley's general views of the arrangement and classification of birds, inasmuch as it differs very considerably from either of those at present in use in this country; and his deviations from the beaten tracks are so considerable, and so important that it will be interesting to lay them before the ornithologists of this country, merely as a matter of information, and not in any degree to offer my judgment on them for better or for worse. Novelty ever commends itself to our notice, and almost invariably to our favourable notice.

Mr. Shelley divides the birds of Egypt into thirty-seven families, and these are grouped into six larger divisions, one of which is left unnamed and the remaining five are denominated "Orders," thus:—

I. [Unnamed group.] It comprises eight families:—*Turdidæ*, containing 10 species; *Sylviidæ*, 57 species; *Nectariniidæ*, 1 species; *Certhiidæ*, 1 species; *Laniidæ*, 6 species; *Muscicapidæ*, 3 species; *Hirundinidæ*, 6 species; *Motacillidæ*, 12 species, 3 of which are placed in the genus *Motacilla*, 3 in *Budytes*, 6 in *Anthus*; *Alaudidæ*, containing 12 species; *Emberizidæ*, 4 species; *Fringillidæ*, 12 species; *Oriolidæ*, 1 species; *Sturnidæ*, 2 species; and *Corvidæ*, 7 species.

II. Order PICARÆ. Comprises eight families :—Yungidæ, containing 1 species; Cuculidæ, 4 species; Upupidæ, 1 species; Alcedinidæ, 3 species; Coraciidæ, 1 species; Meropidæ, 3 species; Cypselidæ, 4 species; and Caprimulgidæ, 2 species.

III. Order ACCIPITRES. Comprises five families :—Strigidæ, containing 9 species; Falconidæ, 40 species; Columbidae, 8 species; Pteroclidæ, 3 species; and Tetraonidæ, 4 species.

IV. Order GRALLÆ. Comprises three families :—Otididæ, containing 3 species; Charadriidæ, 62 species, including the cranes; and Ardeidæ, containing 9 species.

V. Order ANSERES. Comprises six families :—Phœnicopteridæ, containing 1 species; Rallidæ, 29 species, and including the swans, geese and ducks; Pelicanidæ, containing 18 species, and including the terns; Laridæ, 12 species; Procellariidæ, 2 species; and Podicepidæ, 5 species.

VI. Order STRUTHIONES, containing only the ostrich, the authority for including which Mr. Shelley quotes from Finsch and Hartlaub's 'Vögel Ost-Afrika's': he did not meet with it, and failed to obtain sufficient evidence of its present existence within the Egypt district, bounded on the north by the Mediterranean, on the south by the second Cataract of the Nile, and on the east and west by the Arabian and Lybian deserts.

Of the 352 species contained in the preceding summary, Mr. Shelley seems to feel some doubt as to the propriety of including many which he has not himself observed: the missel thrush, hedgesparrow, great gray shrike, jackdaw, magpie, Cornish chough, swift, tawny owl, ashcoloured harrier, common kite, stock dove, both the swans, &c., he considers to have been admitted into the list on doubtful ground. He has taken great pains in all instances to give his authority, and has done so with a candour and exactness that are above all praise. The common swift of Egypt is the *Cypselus pallidus* of our author, who never met with *C. apus*; and *C. melba*, which we regard as a great rarity in Britain, is also a rare bird of passage in Egypt and Nubia, only met with in the more mountainous parts during the autumn and spring. Mr. Shelley thinks the common kite of Britain "has never been met with in Egypt, although Ruppell goes so far as to call it common about Alexandria." No mention is made of the great bustard, and we may conclude it is unknown in Egypt, although it seems a country well adapted to the requirements of this magnificent

bird. *Otis tetrax* and *O. Arabs* are included on very doubtful authority.

I have selected for quotation a few of the incidental notices of birds both from the "Introduction" and from the systematic list, thinking they would interest my readers, but as usual I have endeavoured to avoid merely technical descriptions. The kingfisher's habit of hovering over the water is not only interesting as a fact in Natural History, but is very prettily told.

Kingfishers.—"The black and white kingfishers (*Ceryle rudis*) are very plentiful, and never fail to attract attention as they hover over the pools in search of their finny prey, which they appear rarely to drop upon directly from the bank where they have been sitting, as does our own kingfisher, but hover like a hawk over the water—and, if unsuccessful in their dart, rise apparently unconcerned, to go through the evolution again and again until they succeed, when they retire to the bank to enjoy their meal."—P. 15.

The multitudes of pigeons have been noticed by every traveller in Egypt, and the state in which they live, like our sparrows, under the shelter of human edifices, cannot fail to strike the stranger.

Pigeons.—"The number of these birds which live in a semi-domesticated state, is quite marvellous. The natives in most of the villages build a second story to their houses, solely for the sake of these pigeons, which flock to them as soon as they are built; but they require that their houses should be kept more cleanly than the abodes of the natives; otherwise they leave for better quarters. What would our English farmer say to having these myriads of pigeons feeding on his land? Yet there is no denying that the Egyptian crops thrive well nevertheless; and their guano is there considered to more than compensate for the grain they eat, as this kind of manure is particularly valued for the cultivation of the sugar-cane. Although the native gives himself so much trouble to keep a stock of these birds in the villages, none dispute the stranger's right to shoot as many of them as he pleases in the fields; and it certainly adds considerably to the pleasure of the Nile-trip always to feel oneself lord of the manor, with perfect liberty to shoot what we please and walk where we like, regardless of crops or boundaries."—P. 21.

A doubt has long been entertained on the unity of species of these winged multitudes; some authors referring them all to *Columbia livia*, others considering that there is a large intermixture of a second species, *Columbia Schimperi*. This doubt

does not seem dissipated by the evidence of the volume before me. It is well known that the usual distinctive character of *Columba livia* is the white rump; but this character is lost in domestication,—I mean *lost as distinctive*,—for the white rump is far more uncommon than any other colour: thus it is evident that this character becomes inconstant and almost evanescent under continued domestication. At Oban I observed many pigeons breeding in the rocks, and here also the white rump is by no means invariable: the rump, or more properly the lower part of the back, including the tail-coverts, is frequently blue or gray. Professor Macgillivray disposes of this variation by supposing it a proof of domestication. This usually logical writer seems rather to contradict himself in the following passage:—"Among the vast numbers of undoubtedly wild specimens which I have seen, I have not observed any remarkable variations of form and colour: the dark coloured, purple and white individuals which are occasionally seen consorting with the wild doves, or residing in maritime caves or rocks, are in all probability domestic birds that have betaken themselves to the original mode of life."—Vol. i., p. 27. Still such variation is of common occurrence, and, whatever the explanation, the white rump has completely vanished from the dark-coloured and purple individuals. The same aberration of colouring has occurred on our south coast, where the species is far from abundant, and hence it has been said that *Columba ænas* is occasionally found breeding on rocks—the determination of the species, I suppose, being decided by the colour of the rump. In Ireland one sees many piebald doves breeding on the rocky coasts, and this piebald appearance has led to the proposal of a new species, *Columba macularia*. This supposed species, which wants the black bars on the wing as well as the white rump, breeds in great numbers at Sybil Head, as recorded by Mr. Andrews in a paper read before the Dublin Natural History Society in November, 1841. I will now quote Mr. Shelley's observations on this variation as observed in Egypt.

"By far the greater proportion of Egyptian pigeons have a gray rump, and such birds I refer to the next species, *Columba Schimper*, although I consider the colour of the rump to be a rather doubtful mark of specific distinction, as one cannot feel sure of the purity of the breed of even the apparently wild race."—P. 212.

Of *Columba Schimperi*, Mr. Shelley writes thus:—

“I think there can be no doubt that there are two races mixed in the vast semi-domesticated flocks, and living more or less in a pure wild state in the cliffs which in some places border the river. The one race has a white rump, and is *C. livia*; the other, and by far the most abundant, has a slate-coloured rump, and belongs to the present species. Von Heuglin does not admit the specific distinctness of these two races, and considers them all to belong to *C. livia*, which is in my opinion an error. Mr. E. C. Taylor (*Ibis*, 1867), on the other hand, includes all the pigeons under the name of *C. Schimperi*, with the following observations:—‘Flocks of pigeons, perfectly wild, frequent the precipitous rocks that here and there border the Nile. I have frequently shot examples of them, and have always found them to possess the characteristics of *Columba Schimperi*, being decidedly and conspicuously distinguishable from *C. livia* by the absence of the white rump which forms so marked a feature in that species.’ I have certainly shot pigeons both with and without the white rump; the former must undoubtedly be *C. livia*, and the latter, which, on many occasions, had the strongest claims to be considered pure-bred wild birds, I refer to the present species, *C. Schimperi*, as they were certainly not *C. ænas*, a bird of whose capture in Egypt I entertain very strong doubts.”—P. 213.

From these observations and opinions various questions may arise:—1. Are there one or two species of rock dove in Britain and Egypt? 2. Is the domesticated species in Britain identical with the domesticated pigeons in Egypt? 3. Are the wild rock doves of Britain identical with the domesticated rock doves of Britain? 4. Are the wild rock doves of Egypt identical with the semi-domesticated rock doves of Egypt? Of course I draw no line between the term “dove” and “pigeon.” Supposing that the perfectly wild and thoroughly domesticated pigeons or doves constitute but a single species it is an interesting phenomenon, for we find in almost all other instances a doubt expressed whether the same species can exist, flourish and abundantly increase, under these two opposite conditions.

There is an amusing passage as to the difficulty of meeting with wild duck in the marshes at Damietta. Mr. Shelley was assured there were ducks in the neighbourhood, and his guide accounted for their invisibility by pointing to the bottom of the lake, and asserting that they were all asleep there during the heat of the day, and would come up again in the evening: he adds:—

“Ducks are certainly extremely abundant in the neighbourhood; for that evening we saw what we at first took to be a thunder-cloud, but what proved

to be an immense flock of wild-fowl, and I saw similar flocks upon several occasions towards flight time, but could never get within range."—P. 26.

However, notwithstanding this mystery and disappointment about ducks, Mr. Shelley was very successful in his shooting in the Delta, and obtained several species he did not meet with afterwards: he gives a list of these as a guide to other ornithologists.

- "1. *Aquila imperialis*, Imperial Eagle.
2. *Circus æruginosus*, Marsh Harrier. Far more abundant in adult plumage in the Delta than elsewhere.
3. *Scops giu*, Scops Eared Owl. Tolerably plentiful near Alexandria.
4. *Centropus ægyptius*, Egyptian Lark-heeled Cuckoo.
5. *Alcedo bengalensis*, Small Indian Kingfisher.
6. *Acrocephalus stentorius*. Near Damietta in March and April.
7. *Calamodyta melanopogon*. In the same marsh through the year.
8. *Chettusia leucura*, Whitetailed Plover.
9. *Rhynchæa capensis*, Painted Snipe.

Bittern, spotted crane, many kinds of ducks, gulls and terns. Among the common English birds which are likely to be met with south of the Delta, are the blackbird, robin, stonechat, linnet, chaffinch, goldfinch, rook, starling, golden and gray plovers, and water rail."—P. 27.

We have no interviews with crocodiles from beginning to end of the volume, but reliable evidence, if such were required, that they still frequent the Nile, and strong presumptive evidence that they occasionally make a meal of a juvenile native.

"As we ascend the river we come to the perpendicular rocks of Gebel Aboofayda, which rise precipitously out of the water: this is a good locality for meeting with the crocodile: and here during my last tour Lord Ducie killed one, which, on dissection, proved to contain in its stomach all the ornaments of a native child."—P. 44.

I make the next extract to show that the supposed species into which *Sylvia suecica* has been divided by the greater or less amount of rufous colour on the breast must be abandoned: the note on its habits, confirming as it does Captain Hadfield's observations on a specimen in the Isle of Wight, is very interesting. The passage also will remove the prevalent notion that *Sylvia suecica* is peculiarly a northern species.

"This is an extremely abundant species in some parts of the Delta, and is very generally distributed throughout Egypt and Nubia, especially in the damper localities, or where the vegetation grows to the height of several feet.

Although it frequents reedy marshes and mustard-fields, or wherever vegetation is luxuriant, it rarely alights upon the plants, but almost invariably keeps on the ground, where it runs with tail upraised, stopping every now and then to pick up an insect or to watch the intruder from the edge of its retreat. Specimens differ considerably in the colour of the spot on the throat, which may be met with in all stages from pure white to rufous."—P. 85.

The following note on Savi's warbler, in what may be considered its home, will be interesting to those who bear in mind that it was formerly a regular summer visitor to our eastern counties, coming to breed there, and leaving in the autumn.

"This warbler is resident in Egypt, tolerably abundant, and generally distributed. It usually frequents cornfields, selecting the spots where the crop grows most luxuriantly; and it may also be found in the reedy marshes of the Delta and Fayoom, where I have frequently seen it and occasionally procured specimens. When disturbed it leaves its shelter very reluctantly and flits away hurriedly, flying close to the top of the herbage for a short distance, and then it suddenly dips down and is immediately hidden. Nor will it allow itself to be driven far from the place whence it originally started, but if pursued prefers to seek shelter by creeping among the stalks of the plants rather than expose itself again by taking wing. On this account the bird is difficult to procure, and is consequently rare in collections."—P. 89.

The usefulness of the kestrel as an insect-eater is briefly noticed: Mr. Shelley on one occasion saw at least a hundred in a single clump of palm trees, attracted by the locusts which were passing in dense continuous clouds beneath them: like the redfooted falcons, the kestrels of both the Egyptian species seem to feed almost exclusively on insects. The same is the case with the black-shouldered hawk (*Elanus caeruleus*), a northern resident Egyptian, which—

"Generally frequents the sount trees; but I have rarely observed more than a pair in the same clump. The food consists of insects and mice, which I have seen it pursuing after sunset when I have been waiting for duck. Being by no means shy, its habits may be easily observed, and I have seen a bird occasionally remaining perched upon the top bough of a sount tree for hours together, uttering at intervals a low cry to its mate, who is rarely far off. By this rather peculiar cry, which it frequently repeats while sitting on its eggs, I was attracted to its nest on one occasion. The eggs, though rare in collections, are by no means difficult to find in Egypt. It begins breeding towards the end of February, and appears invariably to select a sount tree for its nest, which is constructed of sticks and reeds put

together with some care, and smoothly lined with the dried leaves of the sugar-canes. The eggs somewhat resemble those of the kestrel, but are rarely quite as rounded in shape, and show more of the white ground, while the brown markings look like dry paint smeared carelessly over the surface."—P. 199.

The spotted eagle (*Aquila nœvia*), of which no less than six specimens have been obtained in the British Islands, is the most abundant species of eagle in Egypt, but is less plentiful in Nubia. During Mr. Shelley's visit to the Fayoom, in February and March, it was extremely plentiful, and was generally to be seen sitting still near the water's edge. Like our British eagles, it was frequently observed devouring pieces of decomposing fish, which appeared to constitute its chief food in the Fayoom. As might be expected, vultures are plentiful enough in Egypt, *Gypætus nudipes*, *Vultur monachus*, *V. auricularis*, *Gyps fulvus* and *Neophron percnopterus*, the two last particularly. At Edfou Mr. Shelley met with several hundreds of *Gyps fulvus* around the body of a dead camel, which they were so reluctant to leave that his dragoman struck at them repeatedly with his stick before they would take wing. *Neophron percnopterus* was extremely abundant throughout Egypt and Nubia, where they might daily be seen feeding in pairs or flocks upon the offal around the villages, or slaking their thirst on the opposite sand-banks.

It is seldom we have an opportunity of learning anything of the pratincole from an eye-witness: it seems that this curious bird is another follower of the swarms of locusts, and dependent on them for its chief sustenance. I may mention that Mr. Shelley places it in the family Charadriidæ, thus indicating his views of its affinities.

"This pratincole arrives in Egypt in great numbers about the middle of April. I first met with it near Assouan on the 15th of that month, and afterwards saw it in great abundance as I descended the Nile, sometimes on the bare fields, but more frequently by the sides of small pools or on the numerous sand-banks of the river. The flight is very peculiar and varied, the birds at times passing rapidly through the air in flocks, like plovers, or else floating at a considerable height with outspread wings, or again playing over the water after the manner of terns. When I first saw a single specimen of this bird rise from a small pool, I should have taken it for a green sand-piper, which it closely resembled in the colour of its back and flight, had it not been for the greater length of the pinions. Probably the larger portion

of these flocks do not remain in the country to breed, but pass on into Europe, returning again in October or November on their way south. When I met with them their chief food consisted of locusts, which were extremely abundant."—P. 227.

The creamcoloured courser is so rare a bird with us that the least scrap of intelligence respecting it is eagerly sought and most thankfully received. Mr. Shelley seems to have met with it only once, but that once afforded him an excellent opportunity of observing and recording the cursorial powers from which it has received its most appropriate name: my reader is referred to Mr. Harting's 'Handbook' for the particulars of the score of specimens which have been observed in Great Britain. The following is Mr. Shelley's account of his interview with these birds: it seems to have terminated greatly to their disadvantage.

"This species, although a resident, is not very abundant in either Egypt or Nubia. It is a desert bird, preferring the sandy wastes to the more cultivated parts, and is generally to be met with in small flocks, probably consisting of the last year's brood. I myself only found it on one occasion, on the 4th of February, opposite Aboofaydā, where I had a most exciting chase, as I had recognized the birds, and was anxious to procure a specimen. They were four in number, and very shy; they, however, preferred running to flying, never remaining long on the wing. Finding that I could not stalk them in the ordinary way, I drove them towards a bush, and then making a long round got up to that piece of covert, and shot one and broke the leg of a second. This wounded bird detained the other two, and enabled me to procure one of them. The wounded one was now alone, and so shy that I had great difficulty in procuring it, which I finally succeeded in doing by walking on one side instead of directly towards it, when it crouched on the sand, hoping to be passed unobserved; and thus, after an hour's pursuit, I obtained my third specimen."—P. 227.

I do not recollect a single instance in which that singular bird the spurwinged plover has vouchsafed to pay us Britons a visit: it is distinguished by the possession of a sharp black spur on the carpal joint of the wing. Mr. Shelley has not recorded any observation as to the use of this extraordinary but not unique armature; but perhaps he concludes all his readers should be already informed on its pugnacious or defensive habits: it is a common thing for authors to assume too much knowledge on the

part of the readers, and thus, from the fear of being charged with telling a thrice-told tale, they withhold information which would be acceptable to the majority of their readers, though perhaps perfectly familiar to the better informed minority. Mr. Shelley's notes on the breeding habits of this plover are interesting.

"The spurwinged plover is one of the most abundant birds in Egypt, where it remains throughout the year. In the fields and on the sand-banks it may be constantly seen, either sitting motionless, with head depressed, and shoulders up, trying to elude observation, or else standing erect, and constantly moving the body with a little spasmodic jerk. Its cry is loud and varied, and is frequently heard. In March this species commences to breed, at which season I have found as many as thirty nests close together towards the point of a sand-bank: it also breeds in the fields. The nest consists of a neat circular shallow hole in the sand, roughly lined with short pieces of dried reed, just sufficient to prevent the eggs from touching the ground."—P. 232.

Again, I cannot forbear quoting a short passage on that rarity of rarities, the blackwinged stilt. How often have I read dear old Gilbert White's account of the six that were seen, and the five that were killed, on Frensham Pond, and his reflection on their strange and abnormal length of limb! How often have I meditated on his narrative, and his calculation that had the birds weighed four pounds, and had the legs been elongated in proportion, they would have measured "one hundred and twenty inches and a fraction!" How often have I envied that good Bishop of Winchester who possessed that "large lake lying between Wolmer Forest and the town of Farnham"! How often have I visited that large lake and looked in vain for the "stilt plovers," as White was the first to call them. How have I longed to see that classical specimen which was "stuffed with pepper"! How often have I thought of its being "a bad walker, and liable, in speculation, to perpetual vacillations, and seldom able to preserve the true centre of gravity." And here we have a gentleman of veracity who says that he has seen them daily striding about the shallow pools of the Delta perfectly indifferent to the astonished gaze of man.

"Abundant both in Egypt and Nubia, but more especially so in the Delta, where it may be almost daily seen in small flocks, striding about the shallow pools which are so frequent near the villages, perfectly undisturbed by the presence of man, for the natives never molest it."—P. 260.

Then we come to the sacred Egyptian ibis, sacred no longer, Egyptian no longer: we seem to feel an intense desire to learn more of his history than the author has given us, infinitesimally small, and either purely negative or entirely speculative. The reason why the ibis was so esteemed in olden Egypt—a fact which its mummified remains seem to attest—was, according to Herodotus, its intense antipathy to snakes and other reptiles; and, in the estimation of that venerated historian, the ibis seems to have held office in the preventive service of Egypt, its duty being to keep all snakes out of the kingdom; a similar office was held in Ireland by St. Patrick, who until this day exercises his restraining influence to such an extent, that every attempt made to acclimatise snake or adder in the sister island has proved an utter failure; and the prohibition extends even to the innocent toad: this I cannot help attributing to the saint's imperfect knowledge of Natural History. It is a bold suggestion, I confess, but while I am calling in question these *Celeberrimi*, I may say that, supposing the ibis to have fed on snakes in the time of Herodotus, and thus merited divine honour, I should be inclined to attribute the propensity rather to a taste for that particular diet than to an antipathy to the animals themselves; thus in different ages we see things in a different light, and it is with extreme diffidence that I venture an opinion opposed to that of the Father of History. Dr. Baird, in his 'Cyclopædia of the Natural Sciences,' informs us that the ibis "is a migratory species: it makes its appearance in Egypt as soon as the waters of the Nile begin to rise, and disappears when the inundation terminates." The Rev. J. G. Wood repeats this information, adding "and therefore deprived it of its daily supplies of food: the bird probably owes its sacred character to the fact that its appearance denotes the rising of the Nile, an annual phenomenon on which depends the prosperity of the whole country." (Wood's Nat. Hist. ii. 689.) This phenomenon, as will be seen below, escaped the notice of Mr. Shelley, as it has of all the ornithologists who visit Egypt; and hence the inference as to its connection with the once-sacred character of the ibis, has not been adopted by these practical observers.

"I can find no authenticated instance of this bird having been seen in Egypt in modern times, although there can be no doubt that it once lived in that country; for the food found in many of the mummied specimens consists of shells, insects and reptiles, now common in

Egypt. Some authors imagine that the ibis was brought into the country by the ancient Egyptians; but this appears to me highly improbable, as it would be the only instance of an animal not indigenous to Egypt having been made an object of general worship by that people."—P. 261.

The last bird I shall mention is Allen's gallinule (*Porphyrio Alleni*), so named by Mr. Shelley in honour of its discoverer, the late S. Stafford Allen, a most intelligent, enthusiastic and persevering ornithologist, who died in Egypt at an early age, sincerely lamented not only by his friends, but by a large circle of his brother naturalists. The bird which now bears his name is of smaller size and more graceful form than the familiar and beautiful violet gallinule (*Porphyrio hyacinthinus*), which Mr. Shelley met with abundantly in the Fayoom: he never saw *P. Alleni*, with the exception of an immature specimen lent him for description in this work. *P. hyacinthinus* frequents thick beds of reeds and half-sunken bushes, and, like the common moorhen, is very partial to perching up in them, and if unobserved will remain there motionless until the sportsman has passed, before taking wing.

A word at parting. The value of these local lists, interspersed with notes as to breeding habits, migration, food, &c., possess more than a passing interest: when made with the care and with the truthfulness which are so evident in Mr. Shelley's volume, they constitute the material out of which Natural History must ever be woven; they are the warp and woof of some rich fabric the artificer of which has not yet made himself known in the world.

The coloured plates by Mr. Keulemans are excellent, and possess a seemingly truthful character which greatly enhances their value: by what inspiration he has managed to infuse life into the representation of bird-skins, I am at a loss to conceive. Of course I am unable to vouch for the attitudes he has given them. I can only say that they look easy and natural.

EDWARD NEWMAN.

Ornithological Notes from Devon, Cornwall, &c.

By JOHN GATCOMBE, Esq.

SEPTEMBER TO NOVEMBER, 1872.

Guillemot, Starling, Wood Lark, &c.—It appears that for a short time during the autumnal moult the guillemot must be unable to

fly, as to-day (September 10th) I examined one which had the entire set of primary, secondary and greater wing-covert feathers quite new, perfectly regular and beautifully formed, though very short, the longest of the former not exceeding one inch. Also observed numbers of young starlings, with black patches and white spots already appearing in various places on the plain brown immature dress. Was glad to see several families of young wood larks frequenting the same fields in which I observed pairs of old ones during the spring. Titlarks are now to be seen in their bright autumnal dress; and many of the stubble-fields are alive with large flocks of gleaning sparrows and finches.

Lesser Blackbacked Gull, Wheatear, &c.—Sept. 11. Examined an adult lesser blackbacked gull which still retained the pure white head and neck of the breeding season. A great many wheatears, both young and old, have made their appearance on the coast previous to their departure for the winter. Was told by one of the Eddystone Lighthouse men that great numbers of small birds flew against the lantern during the spring, especially wheatears, many of which were picked up in the gallery and on the rock below, and that on one occasion there were enough for the men to make a "jolly roast," as he termed it.

Raven, Blackheaded Gull, Green Woodpecker, &c.—Sept. 12. Saw in Bickleigh Vale, near Plymouth, several ravens, many green woodpeckers and kestrels. Observed, on the 13th, the first black-headed gulls in the harbour after their return from the breeding stations. On the 14th noticed many water ouzels, gray wagtails and a kingfisher or two on the River Avon.

Sanderling.—Sept. 16. Examined some sanderlings which were killed on the coast. This species, generally scarce in our neighbourhood, appears to have been unusually plentiful during the past few weeks.

Pied Jackdaw.—Sept. 17. Near Lifton saw a jackdaw which much resembled a magpie, and a few years since saw two pure white ones which were killed at Launceston, about four miles from the above place, and which I believe were bred on Launceston Castle.

Rooks and Gulls.—Sept. 21. Observed sixteen rooks flying round and dipping in the water among a flock of gulls, at the stern of the "Royal Adelaide" in the harbour. Acting like gulls has become quite a habit with the rooks in our harbours.

Snipes, Herring Gulls, &c.—Sept. 23. Going by the rivers Teign and Exe, on my way into Somersetshire, observed an immense number of blackheaded and herring gulls on the mud-banks, which took no notice of the passing train, though within forty yards of it. When visiting the flat marshy moor near Bridgwater noticed kestrels to be very plentiful, attracted no doubt by a kind of short-tailed mouse, or vole, which abounds in that locality. On examining the stomach of one which had been shot, I found it to be perfectly crammed with their remains. These kestrels are much persecuted by crows, which are also plentiful in the neighbourhood. Notwithstanding the good this hawk must do to the farmers, yet I am sorry to say it is killed whenever an opportunity offers. Was told that early in August the willow-beds on these marshes were visited by an unusually large flight of snipes, which, however, remained for a day or two only. Whilst writing about snipes, I may mention a curious circumstance which was observed by a friend of mine when snipe-shooting in Devonshire a few years ago. On rising one of these birds he observed that it flew in a most extraordinary manner; marking it down, he again raised and shot it, when to his great surprise he found that a large earthworm, which it must have been in the act of swallowing, had coiled three-fourths of its length round the bird's neck, reminding him much of the heron and eel in Yarrell's vignette. October 5.—Observed swallows for the last time near Bridgwater. Saw several kingfishers on the banks of the canal between that place and Taunton.

A Visit to Dozmare Pool.—Oct. 6. Heard wood larks singing beautifully in Cornwall. Went with some friends to a rather celebrated spot called "Dozmare Pool" on the Cornish moors, in the parish of St. Neot, and not far from the Bodmin road, where I expected to see some birds, but was rather disappointed: however, some people who lived near the place informed me that numbers of ducks, geese, and even swans were seen there in the winter, and that there was some good snipe-shooting to be had in the neighbourhood, which, from the appearance of the locality, I fully believe. Dozmare Pool is about a mile in circumference, and the formation of such a body of water on high ground is considered singular and curious. There is a popular legend attached to this pool, which is this:—That a person named Tregeagle, rich and powerful, but very wicked, guilty of murder and other heinous crimes, lived near this place, and that after his death his spirit

haunted the neighbourhood, but was at length exorcised and laid to rest in Dozmare Pool; but having in his lifetime disposed of his soul and body to the "wicked one," his infernal majesty takes great pleasure in tormenting him by imposing on him difficult tasks, such as spinning a rope with sand, and dipping out the pool with a limpet-shell with a hole in the bottom, &c., and at times amuses himself with hunting him over the moors with his hell-hounds, at which time Tregeagle is heard to howl and roar in a most dreadful manner, so that "roaring and howling like Tregeagle" is no uncommon expression amongst the people in Cornwall; indeed many would not go near the place after dark for the world. Now I must not dismiss this subject without mentioning what happened during our visit to this mysterious pool. The day being exceedingly hot, with a blazing sun and not a breath of wind stirring, we, being rather tired and hungry, sat down to lunch, after which, feeling drowsy, a death-like silence prevailing at the time, we were almost in a state of doze, when suddenly a noise, as if a mighty whirlwind filled the air, then, with the "whish" of an express train dashing through a station, a flight of a thousand golden plovers rushed by and were out of sight in an instant. One of our party, a young rifleman, who was, I think, fast asleep at the time, and perhaps dreaming of Tregeagle, started up, exclaiming, "What on earth is that? where's my rifle? I wish I had brought my rifle." But, rifle or no rifle, I think he was far too flurried to have used it. Under the circumstances, however, perhaps it was sufficient to startle any one. After all, I was much pleased with Dozmare Pool, and the sight of the golden plovers alone would have fully repaid my visit. I have an idea that the supposed noise of the "hell-hounds" might be caused by the flights of wild geese over the moor at night.

Iceland Gull.—Oct. 9. Remarked a fine Iceland gull flying from the Sound into the harbour, where it joined a flock of about fifty herring gulls. I have rarely seen the Iceland gull so early in the season.

Rednecked Phalarope, &c.—Oct. 12. Examined a young red-necked phalarope which had been sent from Cornwall to be stuffed. It was seen on the 10th busily swimming about on a pond about two miles from the sea, at Treharrock, in the parish of St. Kew, seemingly in pursuit of flies, but when shot at and missed, it flew to another pond not far off, the wind at the time blowing very hard from the eastward. In its stomach I found the remains of flies and minute beetles, the elytra of which were prettily punctured.

The rednecked phalarope is very scarce in Devon and Cornwall. Observed flocks of redwings going west; weather very cold and showery. Many gannets have been seen in the channel lately.

Golden Plover, &c.—Oct. 14. Several scaups, goldeneyes and wigeon in the Plymouth Market, with a few snipes, but golden plovers very plentiful.

House Martin.—Oct. 17. Observed a solitary house martin flying about the streets.

Summer Duck, &c.—Oct. 18. Went into Cornwall and observed large flocks of fieldfares, redwings, lapwings, and a few herons and curlews on the moors; also flights of titlarks, apparently just arrived. Two summer ducks (*Anas sponsa*) were killed out of a small flock of four on the River Erme, near Plymouth, but I have no doubt they must have escaped from some private pond, although they were said to have been exceedingly wary.

Arrival of Winter Visitants.—Oct. 22. Wind blowing hard from the N.N.E. and very cold. A great many cormorants and shags diving about in our bays and estuaries. The common gull or "mew" has also returned from its breeding station, and robins, wrens and kingfishers are now to be found taking up their winter quarters under the cliffs on the sea-coast. Notwithstanding the late gales I have remarked but few terns.

Gray Phalarope, &c.—Oct. 26. Several woodcocks in the market, and on the 27th two gray phalaropes were seen swimming off the Plymouth Hoe, just in front of an inclosed pool kept as a store-pond for marine animals intended for the Crystal Palace Aquarium.

Robin and Humming-bird Moth.—About a month since, when greatly interested in watching the actions of a humming-bird moth among some garden flowers, a robin flew down from a high wall and hovered, kestrel-like, over the moth for several seconds, with its legs and feet thrust out in a most awkward manner, as if it were going to clutch it, when suddenly the moth, seeing its danger, vanished "like magic." It was indeed a most extraordinary, and at the same time ludicrous, sight to behold these two hovering one above the other, as the robin appeared to be imitating the actions of the moth to the best of its ability.

Ring Dotterel and Limpet.—In the October number of the 'Zoologist' there was a circumstance mentioned concerning a sanderling and cockle. Now I can relate something very similar which happened some years ago on the Plymouth Breakwater.

A workman observing a bird fluttering in a rather extraordinary manner ran to see what was the cause, when he found that in running about a ring dotterel had somehow got its toe under a limpet, which in closing instantly to the rock held it fast until the man came up, who with his knife at once disengaged the limpet and set the poor bird free.

Sparrows.—To show how plentiful sparrows are in the stubble-fields just now, I copied the following this morning (November 13th) from the 'Bridgwater Mercury':—"On Wednesday, as Mr. James Wills, jun., was shooting in his father's stubble-field he observed a large number of sparrows, and with the discharge of a single barrel he killed three dozen and one."

Cormorant and Shag.—November 1. Still blowing very hard. Cormorants and shags plentiful, more especially the latter, which have become extremely tame, swimming and diving about in our bays and estuaries close to the shore.

Cornish Chough.—Nov. 2. Examined a nice Cornish chough, which had been trapped on the coast: the stomach contained nothing but very fine sand.

Hawfinch.—Nov. 5. Examined a hawfinch, which had been killed at Lampen, near Liskeard, Cornwall. The contents of its stomach were cracked stones and kernels of the hawthorn berry. This bird appears only at uncertain intervals in Devon and Cornwall.

Rock Pipit.—Nov. 11. When rambling on the coast a few miles from Plymouth I came across a most remarkable "lusus," in the shape of a rock pipit which had four legs, but no tail (at least, where it should have been), but that appendage had actually made its appearance on the head just above the left eye, and projecting behind, very like the depressed crest of a hoopoe. This "head-tail" (if I might so call it) seemed to be quite perfect and full grown, the outer feather on each side being marked with the usual dull white. Two of its legs were in their proper places, but the other pair were dangling from behind, the feet touching the ground, but of no earthly use, being dragged along, as it were, after the bird, and appearing thin, shrivelled and light in colour, with the claws much produced. Indeed it was a perfect "nightmare" of a bird. There could be no possible mistake as to its appearance, as my friend Mr. Bignell and I watched it "off and on" for more than two hours with a powerful pocket-telescope, and could see it

as plainly as if it were in our hands. It was very active, running about and feeding among the sea-weed in company with many of its own species and others, none of which attempted to molest it. It appeared to have no power either of spreading or erecting this tail-crest. I have seen a domestic chicken, not long hatched, with similar hind legs, and another with two bodies, four wings and one head, but I believe such monstrosities seldom live. On either side of the rump of this extraordinary rock pipit were tufts of slate-coloured feathers, from under which the legs appeared.

Golden Plover, Fieldfare and Black Redstart.—Nov. 12. Wind N.E., blowing very cold. Observed three black redstarts on the rocks near the Devil's Point, Stonehouse, and large flocks of golden plovers and fieldfares flying over the fields along the coast beyond Bovisand.

Small Birds feeding off Heaps of Sea-weed.—Nov. 13. Walked many miles on the cliffs towards the Mewstone, at the mouth of the River Yealm. Noticed a great many cormorants, shags, gulls and a few ducks; but what struck me most was the great variety of land birds which I saw feeding on the large heaps of decayed sea-weed accumulated in the fields to be used for manure. On some of these very decomposed and dreadfully "smelly" masses I observed the following species at the same time:—Sparrows, chaffinches, ciril and yellow buntings, linnets, titlarks, rock larks, pied and gray wagtails, hedgesparrows, stonechats, robins, wrens, and large flocks of starlings, not forgetting numerous blue titmice, which latter pay particular attention to these rotten, almost liquid masses, which breed no end of maggots, flies, &c. I have seen these heaps quite white with the droppings of the numerous birds that settle thereon. One day I observed about thirty missel thrushes in a stubble-field on the cliffs just above the sea.

Quails and Stock Doves.—I was told a short time ago that several quails were seen during the past autumn near Tiverton, Devon, and that at the approach of winter multitudes of stock doves (*Columba ænas*) make their appearance in the woods, feeding on the beech-mast. Stock doves are very rare in our neighbourhood and also in Cornwall.

Brown Owl.—A week or two since I examined a brown owl, which had flown down a chimney at Sheepstor, on Dartmoor, during the severe cold winds that prevailed at the time. A servant girl, on going to light the fire early in the morning, saw, as she said, "two

great eyes" staring at her, and, being dreadfully frightened, called out lustily for her master, who on rushing in was just in time to see something disappearing up the chimney, and bravely thrusting up his hand to pull this "something" down, got "something" for his pains which he will not forget in a hurry, his hand being, as I was informed, severely torn.

Scoter and Northern Diver.—November 19. Saw some common scoters and a large northern diver swimming and diving off the "west mud" in the Hamoaze. Scoters appear in large flocks sometimes during November on our coast, especially should the wind be easterly, when they are tolerably tame; but, strange to say, although the large guns of the "Cambridge" gunnery ship were discharging shot at a target in the vicinity of the above-mentioned scoters and divers, they seemed to take little or no heed of the noise. As the big guns are constantly firing close to the "west mud," I think the birds about that locality must have become used to them, just as they do to a passing train.

Snow Bunting and Siskin.—November 20. Dissected a very fine snow bunting which had been killed in the neighbourhood of Mary Tavy: it was very fat, and its stomach contained minute seeds and rather coarse transparent sand or gravel. Snow buntings are very uncommon with us in Devonshire. Two or three days previously several siskins were seen, and some caught, in the neighbourhood of Liskeard, Cornwall.

Kittiwake Gull.—Nov. 23. During a severe gale from the S.W., flocks of kittiwakes made their appearance in the Sound and Harbour, many of which were so exhausted as to allow themselves to be knocked down with stones and sticks. How strange it seems that these poor birds should suffer so much during protracted gales, when the other species of gulls do not appear to be affected in the least. Hundreds of these innocent visitors have been shot during the last fortnight, I am sorry to say.

Richardson's Skua.—Nov. 25. Saw a fine adult Richardson's skua fly past the Devil's Point at Stonehouse. Its somewhat gliding flight was swift and elegant, but it did not attempt to molest any of the smaller gulls on its way, so I think it was merely seeking refuge from the heavy gale that was blowing at the time. I was near enough to see that its upper plumage was smoke-gray, with a white patch or two on the wings, such as most if not every species of skua is sometimes subject to. The top of its head was very

dark, nearly black, and the neck light, tinged with straw-yellow. I possess a mature specimen of Richardson's skua, the butts of the wings of which are of pure white, and there are also white patches on other parts of the body.

Forktailed Petrel and Purple Sandpiper.—Nov. 28. A beautiful forktailed petrel was brought to a birdstuffer for preservation, which was said to have fallen dead on the deck of a government ship. Another was seen off the Plymouth Hoe a day or two before. On the same day I observed two purple sandpipers feeding on the rocks close to the surf, the spray of which sometimes dashed over them.

Northern Diver.—Nov. 29. I remarked a very large northern diver near Bovisand Bay.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth,
December 6, 1872.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 3323.)

NOVEMBER AND DECEMBER, 1872.

Shorteared Owl.—These owls have been very common during the autumn. I frequently put them up from rough grass and beds of yellow reeds on the drain-banks, places which they are partial to, as they afford both dry and thick cover; the colour of the dead grasses and reeds also harmonizes exactly with the chaste and sober yellow-buffs and browns of the bird's feathers, making it difficult to detect. In fact, I have sometimes been first attracted, when my dog has pointed one, by catching the brilliant round eye of the bird. They sit close, often till nearly trodden upon, going away at last with a lazy, zigzag, gull-like flight, and generally alight after flying one or two hundred yards, pitching on some prominent clod: here the owl sits, with his body partly inclined, moving his head slowly from side to side, his eyes glittering like orbs of polished metal. I have then sometimes walked quite close to him, particularly if accompanied by my dogs; they always show immense curiosity at the sight of a dog, especially if drawing slowly forward on the point: the owl then always looks more inclined to fight than fly away. Between the 8th and 10th of December there was a second arrival of owls in our marshes. The

weather at the time was very disturbed. On the 8th, Sunday, a very heavy gale, amounting in some places to a hurricane, swept along the west, the south and south-east of England; and also on the 9th and 10th there was a heavy gale from N.E. on the coast of Durham and North Yorkshire. These storms were scarcely felt in North Lincolnshire, although their course was completely round us. On the 10th a friend, shooting in the marshes, flushed either ten or eleven shorteared owls from a patch of rushes. Since this date, also, I have nearly daily put up one or two on the drain-banks.

Longtailed Tit.—I lately saw, flitting along one of the old hedgerows in the marsh, a flight of these agile, graceful little fellows. It was a somewhat unusual situation for them to be found in, and a long way from the thickly-wooded districts they frequent. This made me think they might perhaps be a migrating party moving southward from some northern station. There was one, hanging upside down on the end of a twig, which undoubtedly belonged to the northern race or variety, as the little fellow's head was quite white, without any shade or tint of rosy colour, as in the *Acridula caudata rosea* of Blyth, our common English type.

Green Sandpiper.—November 4th. A pair seen together, feeding along the "warp" of a marsh-drain.

Snow Bunting.—November 7th. Many large flocks on the stubbles.

Water Rail.—There was an undoubted and very considerable arrival of water rails about the last week in October or early in November: these were principally the young of the year. I found them in all sorts of strange places, often where least expected: several in the small, shallow ditches bordering the highways. In Norfolk, this species appears as a regular migrant in the spring and autumn.* This is the first occasion, however, I have noticed any direct augmentation at this season of the ranks of our local and resident water rails.

Golden Plover.—November 15th. Several large flocks passed across the marsh this morning. Our Lincolnshire golden plover, particularly the early arrivals, are, I always consider, finer and larger birds than the average: thus eight, which I killed by a "right and left" from a passing flock this morning, average nine

* 'Birds of Norfolk,' vol. ii. p. 404.

ounces each. Colonel Montagu gives the weight of the golden plover as between seven and eight ounces.

Wood Pigeon.—November 28th. There have been for the last week, and without any special attraction, several hundred wood pigeons in the marshes near the coast. I believe them to be a migratory flock, as now our local birds never go down to the coast, but remain about the woods and plantations.

Jack Snipe.—December 13th. Are very scarce. I saw the first to-day, and only two others since.

Bullfinch.—Bullfinches, all through the autumn, have been extremely numerous. We see them nearly in every hedgerow.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
December 31, 1872.

Ornithological Notes from Norfolk.

By HENRY STEVENSON, and J. H. GURNEY, jun., Esqrs.

(Continued from Zool. S. S. 3356).

NOVEMBER, 1872.

Little Gull.—One observed by Mr. Preston at Yarmouth on the 22nd.—*G.*

Cromer Lighthouse.—On the 4th five starlings; S.W., rain; and one blackbird. On the 5th a goldcrest; W.S.W., gloomy. On the 10th three starlings; S., rain. On the 27th a goldcrest; S.W.—*G.*

Gray Shrike.—The 'Eastern Weekly Press' states that one was caught on the 19th, on the north denes, Yarmouth, in a bird-catcher's net.—*G.*

Mealy Redpoll.—A female was netted at Hethersett, near Norwich, on the 19th, with several lesser redpolls. One of the latter, with the exception of the red patch, had the whole head and neck white.

Woodcock.—This is another very poor season for woodcocks.—*G.*

Puffin.—A young bird killed at Yarmouth about the 19th.

Redthroated Diver.—An immature bird killed on Rockland Broad on the 16th.

Kingfishers.—Although free from frost to the present time, more than a dozen of these birds have been brought in lately to the Norwich birdstuffers.

Waxwing.—On the 14th a good female waxwing was shot about half a mile from my house at Northrepps by a farmer, as it was flying over his yard. On the 22nd another female was shot at Stiffkey, as I learn from Mr. T. J. Mann, and I have heard of one or two others.—G.

Twites.—A few seen near Norwich on the 2nd by a birdcatcher, who netted two or three with common linnets.

Siskins.—A few seen about the same date.

Gray Phalarope.—Another was seen swimming in the sea at Lowestoft, about half a mile from the shore, on the 1st, by the same gentleman who saw one on the 12th of last month.—G.

Roughlegged Buzzard.—A fine immature bird was shot at Hemsby about the 18th.

Storm Petrel.—One was picked up alive at Cromer on the 15th, and sent to my house: it was dead when I received it. Another was procured at Ditchingham on the 27th, according to a local paper.—G.

Sclavonian Grebe.—A specimen, in winter plumage, was shot near Yarmouth.

Spotted Redshank.—An adult bird, in winter plumage, from Yarmouth, was shot about the 18th.

DECEMBER.

Little Auk.—One picked up dead near the coast on the 4th.

Great Northern Diver.—A fine immature bird killed on the coast about the 15th.

Hawfinch.—It is much to be regretted that this species, which now breeds regularly in many parts of this and the adjoining county, should be so ruthlessly slaughtered in the autumn and winter. During the early part of the month some eighteen or twenty are said to have been shot in one garden at Diss, of which about eight were old males, the rest females and young birds. About the same time six or eight were killed in a garden at Carlton, near Norwich, where they were said to be feeding on the bullaces.

Waxwing.—A fine male sent into Norwich to be stuffed on the 20th.

Pintail Duck.—An adult male in the Norwich Market on the 28th, where, owing to the mildness of the season, wild-fowl have been very scarce.

British Heronries. By J. E. HARTING, Esq., F.L.S., &c.

APPENDIX.

UNDER this head I observe a note from Mr. Bethell, in the 'Zoologist' for December, in which he asserts that I am in error in supposing that any heronries exist in the East Riding of York. I am sorry to hear it, if true, but I will give Mr. Bethell my authority for my statement to the contrary. I gave the locality of Hutton Cranswick, near Beverley, on the authority of Yarrell (Hist. Brit. Birds, 3rd ed., vol. ii. p. 542), and a reference to it in a letter from Mr. W. Boulton, of Beverley, dated 13th January, 1872. In this letter (addressed to Mr. Cordeaux), Mr. Boulton adds, "At Stork Hill, near Beverley, indeed within three miles out of the town, living men recollect a heronry, hence the name of the place, which, however, as ornithologists we must acknowledge to be a misnomer. I know a man, however, who has eaten young herons bred in a heronry at Scorbrough, near Beverley, *i. e.* about four miles from the town." It will be seen by a note from Mr. Boyes, in the 'Zoologist' for January (S. S. 3369), that this heronry gradually decreased until about forty years ago, when the few remaining birds forsook the place, partly in consequence of the trees decaying.

The locality of Newton, near Malton, in the East Riding (misprinted "Walton" in my article in the 'Zoologist' for October last) I gave on the authority of Mr. A. J. Cholmley, of Howsham Hall, near York, who, writing to me on the 16th March, 1872, said, "There is a heronry at Newton, near Malton, in the East Riding, the property of Sir George Cholmley, consisting of about sixty nests built on larch trees.* The plantation in which they are consists of larch, spruce and a few Scotch firs, and sycamores. The herons confine themselves almost entirely to the larch, while a small colony of rooks has taken possession of the Scotch firs and sycamores." It seems fair to infer that my correspondent, from his relationship to the owner of the property, should be better informed than Mr. Bethell, and that the East Riding of York is therefore not so destitute of heronries as the latter supposes.

* Mr. Boyes, who visited this heronry in the spring of 1872, found there were then not more than twenty or twenty-five nests, and Sir George's keeper, who has lived there twenty-six years, informed him that there were never many more than this.—J. E. H.

My acknowledgments are due to Mr. Boyes, of Beverley, for the trouble he has so kindly taken to obtain information for me.

While on the subject, I may as well take the opportunity of making a few corrections and additions to my list, as it appeared in the 'Zoologist' for October last.

ENGLAND AND WALES.

Herefordshire.—The heronry at the Moor, near Hay, I am informed by Mr. J. W. Lloyd, of Kington, has unfortunately ceased to exist. With regard to this and other heronries formerly existing in Herefordshire, Dr. Bull has published the following remarks in the 'Transactions of the Woolhope Naturalists' Field Club for 1869':—"It is yet within the memory of man that many heronries existed in Herefordshire, although they have now become extinct. There was one within a mile of the city of Hereford, on the fine elms at the Moor. It gradually dwindled down to a single pair of birds, and they disappeared about sixty years ago. There was also a large heronry on elm trees at Newcourt, Lugwardine, about three miles from the city, and some few tenants remained to so late a period as 1853. There was a colony of herons occupying some tall oak trees on the north-west side of Brampton Brian Park at the beginning of this century; but when the exigencies of war caused the oak to be felled, the birds joined their neighbours at Willey Lodge. When the Willey Lodge heronry was destroyed the herons were said to have gone to Plowden, near Bishop's Castle, Shropshire, where the number of birds was much increased at the time: this heronry is still in existence. There was formerly a heronry, it is said, at the Marsh Farm, Eaton Bishop, in the centre of the county, and possibly others. But the heronry which existed in the county to the latest period was in the Hawkswood, at the Moor, near Hay, where the herons built on some tall oak trees. This heronry was in the immediate vicinity of a rookery, and here might be seen occasionally a curious border warfare between these very different birds for the possession of some particular tree. This heronry was a very large one up to about 1852, when a large fall of timber disturbed the birds. In the year 1856 there were about a dozen nests there, but the herons gradually diminished in numbers until they were reduced to a single pair, which built there so lately as 1863."

Monmouthshire.—Add, one at Treowen, near Monmouth, where there were eighteen pairs in April, 1870.

Norfolk.—For "Lord Bowers" read "formerly Lord Berners, now Mr. Tyssen Amherst." At Earlham there were twenty-six nests in 1871. In addition to those mentioned, there are three more small colonies in Norfolk, one at Stokesby, near Acle, the others in the parishes of Westacre and East Walton. Mr. J. H. Gurney, jun., informs me that he could not find one at Wolferton, nor at Burnham Overy, but that in Lord Leicester's park adjoining there are two nests.

Shropshire.—Add, one at Plowden, near Bishop's Castle.

Suffolk.—For "Earl of Shadbroke" read "Earl of Stradbroke." Add,—On the right bank of the Blythe, between Blythborough and Walberswick, there is a small heronry in a clump of tall firs, on the property of Sir John Blois. In 1867 there was a colony in Woolverston Park, on the right bank of the Orwell, belonging to Mr. Berners, but in the spring of 1871 they crossed the river and took up their quarters in Orwell Park, where the owner, Colonel Tomline, protects them from all annoyance. Mr. H. F. Bailey, who visited the park in December, 1872, counted about sixty or seventy nests. The heronries which formerly existed at Thrigby, and Norton Hall, near Loddon, were in the adjoining county, and should have been noticed under the head of "Norfolk."

Wiltshire.—A small colony of five or six nests in beech trees exists in Longford Park, near Salisbury, the seat of Earl Radnor.

Warwickshire.—For "Rugby" read "Ragley, near Alcester."

Yorkshire.—For "Newton, near Walton," read "Newton, near Malton," and add—A heronry existed at Hotham, in the East Riding up to the year 1819, the nests being placed in large Scotch fir and ash trees, and persons are still living who used to climb up to the nests to get the eggs. There was a large heronry in Sutton Wood, Sutton-upon-Derwent, a village about six miles from York, but the birds left from continued persecution, and have not bred there for some years. In 1860 there were said to be about one hundred nests there. Up to 1870 one or two pairs bred constantly in a wood called Beswick Rush, near Scarborough, but in that year the keeper destroyed both old and young birds, supposing them to do injury to a trout-stream. Herons also nested in a wood at Holme, on Spalding Moor, but ceased to do so about five years ago.

Denbighshire.—There is a heronry at Vorlas Hall, in this county, belonging to Mrs. Wynn Finch.

Merionethshire.—One at Glyn Hall (Mr. Ormsby Gore), and a few nests at Rug Hall (the Hon. Charles Wynn).

SCOTLAND.

Fifeshire.—I am informed by Mr. W. Ogilvy that up to 1870 a pair of herons nested on his grandfather's property near Dollar, in Fifeshire, the nest being built on a Scotch fir in the centre of a thick wood. Since 1870 they have, he regrets to say, nested elsewhere, but most probably in the vicinity, as they have been frequently observed since then on the banks of the Devon, which flows through the property, his brother having seen them nearly every day since August of the past year.

Inverness.—There is a colony consisting of about twenty pairs on a small wooded island in Loch Knockie (Sir Shafto Adair).

IRELAND.

Cork.—For "Capt. R. Coole Bowen" read "Capt. R. Cole Bowen"; and add—Kilbrittain Castle, about thirty nests on larch trees (Col. Stowell), and one at Bunalan, near Skibbereen, in an avenue with rooks.

Donegal.—Add, One near Culmore, on the shore of Lough Foyle.

J. E. HARTING.

Large Otter.—Will Mr. Corbin favour us with the sex, weight and length of the otter he records in the 'Zoologist' (S. S. 3304)? The heaviest Norfolk otter which has come to my knowledge (although by no means the longest) was killed at Bowthorpe, near Norwich, on the 3rd of the present month: it was a male, forty-eight inches long, weighed thirty-seven pounds, and was very fat. A female with young ones, killed in February, 1864, measured forty-four inches, and weighed only fourteen pounds, being in very poor condition; a male killed in 1866 weighed thirty pounds; a male killed in January, 1871, frozen out and in a very emaciated condition, measured fifty-three inches and a half, and weighed thirty pounds; another, also a male, killed on the 10th of last October, measured fifty inches and weighed twenty-three pounds; and a female killed on the 19th of November measured forty-six inches and weighed sixteen pounds. An otter killed in Carmarthen-shire, weighing fifty pounds and measuring sixty-six inches, is mentioned in 'Land and Water' (vol. ii. p. 51). — *Thomas Southwell; Norwich, December 26, 1872.*

Singular Situation for a Squirrel.—On the 4th of November last, while shooting with my brother in some low wet marshes, a dog we had with us found something in a wide ditch with a thin fringe of sedges, which we supposed to be either a waterhen or a water rail, and accordingly prepared for a shot; the dog seemed for a time a good deal puzzled, but at last made a drive at something in the water, and pulled out a live squirrel. This occurred at a long distance from a tree of any kind, the nearest wood likely to be frequented by these animals being more than a mile from where we found him, and the intervening ground wet and marshy.—*G. S. Pope; Leiston, Suffolk.*

Another Frozen Mammoth.—In the 'Times' of January 17th, under the head of "Arctic Expedition," there is a remarkable notice of an expedition to the North Pole, under the command of a young and wealthy French-American, M. Pavy, extracted from the 'Courier des Etats Unis.' The despatches are dated from the eastern coast of Wrangell's Land, August 23. At eighty miles from the mouth of a newly-discovered great river, "the explorers found on the plain some vestiges of mastodons" (evidently mammoths, *Elephas primigenius*, as indicated in the sequel by the described curvature of the tusks), "and on clearing away the snow from a spot whence emerged the tusks of one of that extinct race, they brought to light its enormous body in a perfect state of preservation. The skin was covered with black stiff hair, very long and thick upon the back. The tusks measured eleven feet eight inches, *and were bent back about the level of the eyes.* The fore legs were bent, resting on the knees, and the posterior parts were deeply sunk in the snow, in a posture indicating that the animal had died while trying to extricate itself from a watery or snowy trough. Professor Newman had not discovered sufficient characteristics on the body of the mastodon to justify his classing it as a different species from the elephant of our day" (showing thereby that he was unlikely to have distinguished a mastodon from a mammoth!) "From its stomach were taken pieces of bark and grasses, the nature of which could not be analyzed on the spot. Over an area of many miles the plain was covered with the remains of mastodons, indicating that a numerous herd of these gigantic animals must have perished there. This region abounds with Polar bears, which live on the remains of the mastodons." Hardly so, or the latter would have disappeared long ago, even if the bones of those animals had been intended. Nothing is stated about any specimens having been secured.—*From the 'Field.'*

Zoology of Mr. Stanley's New African Lake.—"The immediate shores of the lake on all sides, for at least fifty feet from the water's edge, is one impassable morass, nourishing rank reeds and rushes, where the hippopotamus's ponderous form has crushed into watery trails the soft composition of the morass as he passes from the lake on his nocturnal excursions: the

lesser animals, such as the 'mbogo' (buffalo), the 'pundaterra' (zebra), the 'twiga' (giraffe), the boar, the kudu, the hyrax or coney, and the antelope, come here also to quench their thirst by night. The surface of the lake swarms with an astonishing variety of water-fowl, such as black swan, duck, ibis sacra, cranes, pelicans; and soaring above, on the look-out for their prey, are fish-eagles and hawks, while the neighbourhood is resonant with the loud chirps of the guinea-fowls calling for their young, with the harsh cry of the toucan, the cooing of the pigeon, and the 'tu-whit, tu-whoo' of the owl. From the long grass in its vicinity also issue the grating and loud cry of the florican, woodcock and grouse."—*How I found Livingstone.*

[This agreeable passage (which I extract from a review, and not from the book itself) may hereafter receive revision and modification; it seems to require it: it would indeed be a treat to our African tourists to find black swans floating on an African lake and serenaded by gorgeous toucans: the passage suggests the idea of a misprint.—*Edward Newman.*]

The Chillingham Bull.—In every one of our papers we read of the exploit of H.R.H. the Prince of Wales, in shooting a bull out of Lord Tankerville's flock at Chillingham; the head and neck have been stuffed by Mr. Ward, and a figure of these parts, drawn by that excellent animal draughtsman Mr. Harrison Weir, has appeared in the 'Field.' All professional taxidermists seem to entertain the idea that length and slimness of neck is a beauty in beast or bird, and probably from this cause the neck in question has the appearance of unnatural and very untaurine slenderness. Never having had the gratification of seeing these Chillingham cattle, I am unable to express any opinion as to their pedigree or kinsfolk, but I do not learn from this figure, or from the numerous descriptions lately published, that there is any specific or varietal character to distinguish them from the smaller breeds of cattle one sees everywhere in the Highlands. The white colour has been thought distinctive: uniformity in this respect has been attained by assiduously killing off the black, brown or piebald individuals, a process by which any colour might be made to preponderate: the redness of the ears is given by Bingley as distinctive of the breed, but I regret to confess my inability to understand his precise meaning. Are we to understand that the hair covering the outside of the ears is red in the same way that the hair in Herefordshire cattle is red? or does it mean that the skin from which the white hair of the ears is growing has a red or pink tinge? If this last be the interpretation we are to give to Bingley's definition I cannot think it sufficient to characterize a breed.—*Edward Newman.*

Ornithological Notes from North Wales for the Summer and Autumn of 1872.—

Golden Plover.—In June I found these birds breeding in considerable numbers on all the moors. A few are found on the hills all the year round,

but the greater part seem to leave us for the sea-coast for a few months after the breeding season, returning, however, before winter, frequenting the large open pasture-fields which have been reclaimed from the moor. Should the winter prove very severe they seem again to return to the sea-coast, where they remain until it becomes milder, when they are again to be found with us.

Common Sandpiper.—Found several nests of this little bird this summer.

Dipper.—A pair of these birds have built ever since I can remember under the arch of a bridge over a trout-stream near the house, always bringing up two broods during the year. The first nest is completed rather early: this year it contained an egg on the 14th of March. No sooner are the first batch ready to fly than the nest is again repaired preparatory to another brood. A favourite as this little bird is with every one, I am afraid it is a horrid enemy to the trout-spawn.

Merlin.—Breeds regularly on the moors. In May my father found a nest containing four eggs. The courage of this little bird is well known; it will attack a full-sized grouse, though a bird twice its size, one of these birds and a merlin having been killed by the same shot a few days since. It is known in this country as the "little blue hawk."

Kite.—One seen in August. A few years ago these fine birds were undoubtedly not uncommon in this country, but the constant persecution by gamekeepers, &c., has so diminished its numbers that it is now looked upon as only an occasional visitor.

Pied Flycatcher.—I found two nests of this bird this summer. As I have before remarked in the 'Zoologist,' it is a regular summer visitor to us, but this year it did not seem as plentiful as usual.

Gray Phalarope.—One shot in August by a gentleman out grouse-shooting; it got up out of the heather. There was no water near.

Grouse.—A handsome variety of this bird was shot by a gentleman near here in September; the general colour was a light buff, but the markings of the feathers were distinctly to be seen in a darker colour.

Green Sandpiper.—One shot by a gentleman near here in October; another observed by myself during the same month.

Siskin.—On the 6th of August I noticed a flock of these birds. They are regular winter visitors to this country, but I never remember to have seen them on so early a date: the flock consisted of about twenty birds, almost all young ones of the year. Is it possible that they could have bred with us?

Bramblings.—At the beginning of the month (November) mountain finches were extremely numerous, frequenting the stubble-fields in considerable numbers.

Woodcocks.—These birds seem pretty numerous this season. Although I have not heard of any large bags having been made, there seems to be a

very fair sprinkling throughout the country. Visiting us, as these birds do in the winter, in large numbers, and well adapted, as some of our woods are, to their habits, I have not been able to discover a single instance of their remaining with us to breed.

Snipes.—Are now numerous in all our bogs: they breed with us in large numbers.—*W. J. Kerr; Maesmor, Denbighshire, North Wales.*

Sea Eagle in Jersey.—I have fortunately secured a fine specimen of the cinereous or sea eagle (*Haliaëtus albicilla*), which was killed on the rocks called "Les Menquiers," a shoal about five leagues in length, on which are a few fishermen's huts, about half-way between this island and France. The bird is a female, and was shot by one of the fishermen and secured after a great deal of trouble, having fought vigorously, although severely wounded. It measured from tip to tip of wings eight feet six inches, and from beak to tip of tail three feet seven inches.—*Christopher Allinson Green.—From the 'Field' of November 30.*

Whitetailed Eagle near Rye.—A bird of this species was shot at Iden, near Rye, last week, by a labourer, and sold for a crown. Although I am nearly sure it is a sea eagle (*Haliaëtus albicilla*), its tail is not white. I see it has been affirmed by some writers that the tail is not white till the third, and by others till the fifth, moult. This specimen is certainly not a bird of this year. I have examined the crop and gizzard: the former was quite empty, the latter had two small fish-bones and a fish's eye about the size of a pea in it. The wings when outspread measured very nearly eight feet. It has seven scales on each outside toe, five on the inside, twelve on the middle, and four on the hind ones, besides four or five above the knee-joint. Should I have named the eagle wrongly, I should be glad to be corrected. It is in the hands of Mr. Garson, naturalist, Rye, and he has stuffed it very creditably.—*'Field' of November 30.*

Molothrus sericeus in Devon.—In the 'Field' of January 25, 1873, Mr. W. S. M. D'Urban reports the occurrence of a specimen of this South American bird, which was shot whilst feeding near Exeter with a flock of starlings: of course it is presumed to be an escaped bird. It is not a migratory species, and there are several specimens in the Zoological Gardens.—*E. Newman.*

Nesting of the Redwing in North Yorkshire.—The following note, to an article on Natural History by the Rev. J. C. Atkinson, appears in the 'People's Magazine' for December, 1872, p. 379:—"I obtained four eggs about ten years ago from a nest in Commondale (North Yorkshire), about which, from the circumstances connected with bird, nest and eggs, there could be no reasonable ground of doubt as to their origin. Only I did not see the bird myself. I received the eggs and the account from a person whose father had been a gamekeeper, and whose own habits had led him to act often as amateur keeper, and had made him very familiar with various

birds and animals. Hence the eggs, when shown to some metropolitan egg-authorities, were pronounced to be not redwing's, but ring ouzel's, eggs. However, during the past spring a redwing's nest and eggs, together with the parent bird herself, have been obtained in Glaisdale, another district (originally) of the same parish to which the Commondale mentioned above belongs; the person meeting with them being a very competent ornithologist and experienced egg-collector. The fact that the redwing does occasionally breed in North Yorkshire, and I think not so very unfrequently, is an interesting one, and therefore not unworthy of record here."—*H. W. Feilden.*

Varieties of the Sky Lark.—For a series of years I have examined our bird-dealers' shops, &c., for varieties of the sky lark, but up to 1871 I never met with any in this district. In July, 1871, I bought a living sky lark having white primaries and secondaries, and soon after got another, also alive, somewhat like it, from the same birdcatcher. Later in the year I procured an almost white one; and, later still, I observed a splendid rich deep brown bird with white wings being handed about in our bird-market, amongst a crowd of bird-fanciers, and, some wrangling going on about its price, I called out, "I'll take it," and on its being brought nearer I saw it was a sky lark, almost black, with all the flight-feathers and tail pure white. Early in 1872 I secured another, somewhat like it, but with less white upon it, and the dark colour more pronounced—almost black; since then I have obtained another very light drab specimen, and yesterday I bought the finest of the lot: it is almost black, but some of the feathers have a fringe of brownish ochrey; it is a male, is very plump, and sings a little. All these seven varieties are caught-specimens. The last light specimen I took out of the "pantil" myself, and all the others except one were obtained from bird-catchers I am acquainted with. To me it does seem strange that for a series of years I should so carefully examine such immense numbers of larks (in one house I went over seventy score dozens in one day) without seeing an abnormal feather, and yet in these last two years, when larks have been comparatively scarce, I should have secured seven good varieties and one or two of less note.—*C. S. Gregson; Rose Bank, Fletcher Grove, Liverpool, December 15, 1872.*

Siskins in East Yorkshire.—On the 24th of December, I saw a pair of these active little birds feeding on the seeds of the nettle and close to the town. I have not heard of any occurring in the neighbourhood for some years.—*F. Boyes; Beverley, January, 1873.*

Lesser Spotted Woodpecker at Taunton.—On the 4th of January a lesser spotted woodpecker was shot at Taunton, and sent to Mr. Wilson, the Pimlico taxidermist, to be preserved.—*W. T. Ogilvy; British Museum, January 16, 1873.*

Pinkfooted Goose.—In reference to the pinkfooted goose breeding in confinement, mentioned by me in the 'Zoologist' for 1872 (S. S. 3243) it

seems worth while to notice the fact that one of the three young ones, though exactly resembling the other two in his earlier days, even up to the date of my note, has now developed bright orange legs and feet, and what ought to be the pink part of the bill is also bright orange. This peculiarity has been apparent for some months; but the orange, instead of gradually changing to pink, as I at first expected, has persisted in retaining its colour, and is now as decidedly orange as the legs and bill of the bean goose; in all other respects he resembles his brothers or sisters (whichever they may be) and his parents.—*Cecil Smith; Bishop's Lydeard, near Taunton, December 26, 1872.*

Bravery of a Muscovy.—Some friends of mine have swans on a piece of ornamental water: they had cygnets, one of which survived: the old birds have recently hatched again, and the male swan immediately persecuted the poor cygnet, beating it and so thoroughly distressing it, that its owners were fain to remove it. On the same water were some Muscovy ducks, and the swan next fell foul of the drake, and began serving him in the same manner; but the Muscovy suddenly leaped on the back of his giant persecutor, and, safely ensconced between his wings, fell to pecking fiercely at the back of his neck. In vain the swan flapped his wings, rushed frantically about, and made every effort to dislodge the Muscovy: he remained immovable, and ceased not to peck away until it was necessary to take him off his perch.—*L. Brightwell.* [Kindly communicated by Dr. Gray.]

Eared and Rednecked Grebes in East Yorkshire.—A very fine old female eared grebe, in full winter plumage, was shot near Spurn about the 20th of December last; and on the 21st an adult female rednecked grebe was shot a few miles above Beverley. The latter was seen diving in a field in the "Carrs," which are now inundated for many miles.—*F. Boyes; Jan. 1873.*

Little Auk and Manx Shearwater near Birmingham.—I have just seen a specimen, in the flesh, of the little auk (*Mergulus alle*): it was captured near this town while in a very exhausted condition, so much so that it died in a few minutes after its capture: it only weighed three ounces and three quarters. Last September a specimen of the Manx shearwater (*Puffinus anglorum*) was also caught in this neighbourhood, which I had the good fortune to see alive.—*W. S. P. Winter; Birmingham.*

Glaucous Gull at Southwold, Suffolk.—An immature specimen of the glaucous gull was shot at Southwold on the 19th of December, and is now in my possession.—*H. Durnford; 1, Stanley Road, Waterloo, Liverpool, January 13, 1873.*

Blackthroated Diver in Suffolk.—On the 29th of December last a blackthroated diver, a bird of the year, was procured about two miles north of Southwold, Suffolk.—*Id.; January 25, 1873.*

Proceedings of the Entomological Society.

November 18, 1872.—H. W. BATES, Esq., F.L.S., &c., in the chair.

Election of a Subscriber.

Noah Greening, Esq. of Warrington, was balloted for, and elected.

Exhibitions, &c.

Mr. S. Stevens exhibited an example of *Vanessa Antiopa* captured by Mr. Hewitson, at Weybridge, on the 1st instant.

Mr. Howard Vaughan exhibited *Crambus verellus*, a species recently detected as British, captured by Mr. C. A. Briggs at Folkestone, in July; and he stated that he had seen two other British examples in the collections of Mr. S. Stevens and Mr. H. R. Cox respectively. He also exhibited varieties of *Pyrameis cardui* and *Vanessa Atalanta*.

Mr. Meek exhibited *Nephopteryx argyrella*, a species of *Phycidæ* not in the British Lists, which he said had been captured by Mr. Button near Gravesend; also varieties of *Arctia caja* and other *Lepidoptera*.

The Secretary read a letter received from Mr. A. R. Wallace, enclosing exuvæ of some insect that had been causing ravages in the collection of South American mosses and lichens collected by Dr. Spruce. The exuvæ appeared to pertain to some species of *Tineina*.

Mr. Meldola exhibited a drawing of the dark variety of the larva of *Acherontia Atropos*.

Papers read, &c.

Mr. Müller read the following:—

“Having lately drawn up, for my own use, a list of the entomological notices contained in the ‘*Verhandlungen der Schweizerischen Naturforschenden Gesellschaft*,’ from 1823 to 1864, as given by its Quæstor, in his history of the said Society,* I here communicate this extract for the convenience of entomologists generally. A certain number of these short papers are of more than local interest, while we look in vain for their complete enumeration in Percheron’s and Hagen’s bibliographical works, as well as in the German ‘*Berichte*.’ It is very likely that other *Entomologica* may occur in these Annual Proceedings under non-entomological titles. If I should meet with any such matter of value, I shall revert to the subject on a future occasion. As regards the years 1840 to 1845, Prof. von Siebold

* T. Siegfried, ‘*Geschichte der Schweizerischen Naturforschenden Gesellschaft*,’ &c., Zurich, 1865, pp. 98, 4to.

has given a *résumé* of the entomological proceedings at the annual meetings of this General Swiss Nat. Hist. Society, accompanied by extracts from the proceedings of the various cantonal societies.† I am not aware of any such published digests for the other years.

“The notices which I have not been able to find in Dr. Hagen’s comprehensive and meritorious ‘*Bibliotheca Entomologica*’ are marked thus (*). Whoever may have the opportunity of searching the publications of the Cantonal Societies of Switzerland will no doubt meet with more.

Bollino, **Sulla malattia dei bachi*; 1860, p. 33.

Bremi, J., *Ueber seine Sammlung von Kunst-producten der Insecten*; 1841, pp. 79.—84. *Aus der Naturgeschichte der Gallinsecten (Cecidomyia)*; 1844, pp. 100—104; *1848, p. 51. *Ueber Anwendung des Schöpfgarnes*; *1846, p. 61. *Ueber Schildläuse (Coccidæ)*; 1847, pp. 41—44.

Chavannes, Aug., *Ueber neue Seidenspinner aus Asien*; 1864, p. 522.

Clarapède, Ed., *Ueber Entwicklung der Spinnen*; 1858, p. 67.

Cornalia (de Milano), **Faits relatifs à la maladie des vers à soie*; 1860, p. 20.

Coudrat, **Ueber Wanderungsverhältnisse mehrerer Schmetterlinge des Jura*; 1839, p. 68.

Davall, **Tortrix pinicolana, &c.*; 1858, p. 68.

David, J. F., **Ueber Nahrung der Bienen*; 1854, p. 45; 1858, pp. 69—72.

De la Harpe, J., **Einwirkung der Temperatur u. a. Einflüsse auf die Farben der Schmetterlinge*; 1848, p. 56 *et seq.* **Papillon fixé sur une feuille par un champignon*; 1852, p. 132.

Dietrich, C., *Ueber die Käferfauna des Kts. Zürich*; 1864, pp. 538—550.

Eisenring, Jos., **Ueber Schmetterlinge um Ragaz*; 1826, pp. 58—61. *Ueber die Schwärmer (Sphingidæ) und ihre Fahndung*; 1844, pp. 157—180. **Ueber Seidenraupe und deren Zucht in Walenstad*; 1857, p. 37.

Felix, **Pfarrer in Nufenen, Insecten aus Rheinwald*; 1844, p. 105.

Forel, Al., *Hémiptère nouveau ou peu connu en Suisse (Deltocephalus aurentiacus)*; 1858, pp. 196—198.

Frei-Herosé, Fr., **Ueber ein Gewebe des Papilio cratægi oder einer Tinea*; 1841, p. 79.

Gengel, Cypr., Chur, *Zur Naturgeschichte der Seidenraupe*; 1846, pp. 201—225.

Gerber, Dr., Bern, *Krätzmilben auf Katzen*; 1864, p. 98.

Heer, O., *Ueber geographische Verbreitung und periodisches Auftreten der Maikäfer*; 1841, pp. 123—153; 1848, pp. 24—45. *Zur Geschichte*

+ Stettin. Ent. Zeitung, 1846, pp. 197—207.

- der Insecten; 1849, pp. 78—97. * Ueber fossile Rhynchoten; 1852, pp. 88, 89. * Communication sur les travaux de Mr. Frei sur les Microlépidoptères; 1853, p. 31.
- Herpin, Genève, * Action du Kermès dans les maladies des voies respiratoires; 1845, p. 106 (medical).
- Lesquereux, Léo, de Neuchâtel, * Insectes de Mammoth-Cave dans l'Amerique du Nord; 1855, p. 53.
- V. Liebenau, M.D., H., Luzern, * Ueber den Bau insbesondere der Insectenflügel; 1835, p. 40.
- Mellet, Pasteur, * Ueber die in der Schweiz gefundenen Käfer *Odacantha melanura* und *Dytiscus dimidiatus*; 1839, p. 68.
- Meyer, Dan., * Ueber Schmetterlinge, die fixirt werden; 1851, p. 130.
- Meyer-Dür, R. Burgdorf, * Cimiciden des Emmengebiets; 1843, p. 123.
* Ueber massenhaftes Auftreten gewisser sonst nur sporadisch vorkommender Insecten; 1848, p. 58. Ueber klimatische und geognostische Einflüsse auf Farben und Formen der Schmetterlinge: 1852, pp. 145—151.
- Meyer, Dr. H., Zürich, * Geschlechtstheile der Lepidopteren; 1848, p. 52.
- Moller, Ernst, * Vergleichende Betrachtungen über den Bau der Gliedertiere und der Wirbelthiere; 1844, pp. 181—203.
- Moricand, Stef., * Fourmis du Mexique envoyées, par Berlandier; 1832, p. 38.
- Perty, M., Bern, * Ueber Häuten der Insecten; 1838, p. 152. * Distribution Géographique des Insectes; 1852, p. 134—136.
- Pictet, Jules, * Ueber die Neuropteren, insbesondere die Perliden; 1840, p. 123. * Sur les Névroptères contenus dans l'ambre; 1845, p. 69.
- Rion, Alph., Relation des ravages causés en Valais, par les Sauterelles en 1837, '38 et '39; 1843, pp. 118—131.
- Scheuchzer, Jb., Chur, * *Gordius* in einer *Locusta viridissima*; 1844, p. 105.
- Schinz, H. R., * Ueber *Oenothera speciosa* und die Sphinges, die in ihr sich fangen; 1835, p. 33. * Ueber eine Art Zecke (*Ixodes*); 1838, p. 146. Ueber *Tortrix scytale*, einige *Plusia*, &c.; 1842, p. 55.
- Schnetzler, J., Vevey, * Sur la lumière dans les Vers-luisants; 1855, p. 54.
- Schulze, Prof., Bonn, Structur des Leuchtorgans der *Lampyrus noctiluca* und *splendidula*; 1864, p. 525.
- Siebold, Prof. v., Freiburg, Ueber Zwitter unter den Bienen; 1863, p. 48 *et seq.*
- Stabile, Gius; * Enumération des Coléoptères observés dans le Tessin; 1853, p. 29. Bulletin Entomologique relatif aux Coléoptères du Mont-Rose; 1853, pp. 30, 214—222.
- Yersin, Al., * Nervensystem von *Gryllus campestris*; 1858, pp. 65—67.
* Neurophysiologie du grillon; 1861, pp. 26—28."

Mr. W. A. Lewis read a paper "On Dr. Hagen's treatment of *Atropos pulsatoria* and *Termes fatidicum*," in answer to Mr. Dunning's remarks at the previous meeting.

Mr. Lewis explained that he had made no error of the kind Mr. Dunning supposed, and that he and Mr. Dunning were at difference not upon facts, but upon the importance attached to them; Mr. Dunning had written in the language of apology only the same things which Mr. Lewis had written in the language of fault-finding.

Mr. Lewis said that the difference concerning *Atropos pulsatoria* was entirely one of words, and continued:—

"Mr. Dunning proves that the Linnean name *pulsatoria* was in 1865 transferred to an insect of the genus *Clothilla*, while in 1861 it had represented an insect of the genus *Atropos*. Granted at once; and therefore the *Atropos* of 1861 is the *Clothilla* of 1865, which is the proposition Mr. Dunning disputes. The very same '*pulsatoria*, *Linné*,' was in 1861 described as an *Atropos* and was in 1865 described as a *Clothilla*, and Mr. Dunning establishes to his satisfaction that the later description is correct. For the purposes of this argument, I will agree with him. What if it is? That concession leaves the facts unaltered, and only makes the indefinite definite in that it fixes the error as having been in 1861, whereas before it lay between that date and 1865. It is the gist of my complaint that Dr. Hagen taught me in 1861 the exact opposite of what he taught me in 1865, though all the same materials were to his hand at the one time as at the other. I am in my turn surprised that Mr. Dunning should think this amounts to nothing. To make a Linnean species in 1861 the type of one genus (without a note of doubt of any sort, kind, or description), and in 1865 make it the type of another genus with opposite structural characters, is a grave and not a trivial matter—more particularly when it is a part of the author's own case that if he had not written his *Synopsis* before he had ever studied the question, he must have found out he was wrong! Mr. Dunning would appear to have concluded that I was under some misconception, from failing to understand that I consider worthy of reprobation what he passes by as nothing."

With regard to *Stett. Ent. Zeit.* 1866, and *Verh. zool.-bot. Gesells. in Wien*, 1866, Mr. Lewis remarked that these references (with which as a fact he was before acquainted) did not affect the question of Dr. Hagen's consistency or inconsistency in 1861 and 1865; and added: "A perusal of the passages cited gives rise to one obvious reflection. The more successful the author is in showing that (when he paid attention to them) the facts were clearly in one direction, the more blameworthy he appears to be for having read them the other way before. The simple fact is that in 1861 Dr. Hagen published a *Synopsis* of the British *Psocidæ* without an investigation of the species. That is the back-bone of Mr. Dunning's remarks, and is, I presume,

the thing he has come forward to justify. Chivalrous as that effort undoubtedly is, I protest Dr. Hagen will owe Mr. Dunning no thanks for it."

Mr. Lewis remarked in continuation that the more important of the two cases had not been answered by Mr. Dunning; and that the criticism impugned by him had been based on both the two instances cited, but especially on that of *Termes fatidicum*, which (at p. 55 of 'Discussion of the Law of Priority') is the climax to which the instance of *Atropos pulsatoria* was merely a step.

"In the passage quoted I draw attention to this. *Termes fatidicum* was an insect of which Dr. Hagen, like all other people, knew absolutely nothing at all—and Dr. Hagen, in spite of that, took upon himself to invest this impalpable idea with a number of minute and special characteristics, such as he could only have ascertained if he had had the thing under his microscope. There could hardly be a more significant example of the bad way some authors have got into in treating the old names than this case of *Termes fatidicum*, and if the author under discussion be a model author, then we have a model instance, and I am glad of it.

"The genus *Termes* of Linné is placed in his order 'Aptera,' the solitary character of which is 'Alæ nullæ in omni sexu.' The description of *fatidicum* is 'abdomen ovate, mouth pale, eyes fuscous;' and to this is added, 'like *pulsatorium*, but twice as large.' Two English authors, Westwood and Stephens, have identified '*fatidicum*, *Linné*,' with an insect which came under their observation. The former speaks of 'the insufficiently characterised *fatidicum*,' evidently referring to the Linnean description; the latter in terms calls his insect '*fatidicum* of Linné.'

"Now take up the Entomologist's Annual for 1861, and you find in Dr. Hagen's Synopsis of the British Psocidæ (p. 22) the *fatidica* of Westwood and Stephens placed in a group distinguished by the presence of ocelli; and in a genus *Lachesis* described as having (in the male) four wings shorter than the abdomen. That is the first step. The insect which Linné gave as apterous in both sexes has four wings in the male in 1861.

"Bear in mind that Hagen's *fatidica* of 1861 has ocelli and short wings. Go to the '*fatidica*, *Linné*,' of Hagen in 1865 (2 Ent. Mo. Mag. 121). In the first place you find it in a paper whose very title is 'Synopsis of *Psocina* without ocelli,' and next in a genus (*Atropos*) whose character is to be wingless!

"Next Dr. Hagen, in this same 'Synopsis of *Psocina* without ocelli,' gives the *fatidica* of Westwood (as being now a different insect from the *fatidica* of Linné) completely ignoring the presence of ocelli which he made a leading sectional character (expressed in capital letters) four years before!

"Once more: Dr. Hagen represents Linné as giving 'Habitat Southern Europe, in dried plants received from Rolander.' The dried plants were

sent by Löffling, and Rolander's name does not occur at all in connection with the insect.

"Now, the dodging about of this insect, or this supposed insect, from one section and genus to another section and opposite genus would have a justification of some kind if this treatment had been occasioned by discoveries made in the interesting periods. Well; none such were made. Says Dr. Hagen in 1861:

"*'Obs.* I am not accurately acquainted with this genus and species; several specimens in my collection which agree with Westwood's description lead me to suppose that they are only a peculiar form of some species of *Psocus* in which the wings are undeveloped (!), &c.'

"Let us see then what discoveries he made before 1865. '*L. Fatidica*, *Westwood*. Unknown to me'; July, 1865 (2 Ent. Mo. Mag. 124). '*Atropos Fatidica*, *Linné*. I do not know this species'; July, 1865.

"Mr. Dunning says with perfect truth that what Dr. Hagen did in the case of *pulsatoria* was to transfer a name from one insect which he knew to another insect which he knew. But what the author has done in the case of the idea *fatidicum* is to invest the same thing first with one set of characters and then with another set of characters, &c., while he has never seen or identified the insect, and never met with or heard of any one who has truly done so in his belief."

December 2, 1872.—Prof. J. O. WESTWOOD, M.A., F.L.S., President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'*The Canadian Entomologist*,' vol. iv., No. 10; Presented by the Editor. '*The Zoologist*' for December; by the Editor. '*The Entomologist*' for December; by the Editor. '*The Entomologist's Monthly Magazine*' for December; by the Editors. '*Note on a Chinese Artichoke Gall* (mentioned and figured in Dr. Hance's paper '*On Silkworm-oaks*') allied to the European Artichoke Gall of *Aphilothrix gemmæ*, *Linn.*,' by Albert Müller, F.L.S.; by the Author.

By purchase:—'*Catalogus Coleopterorum hucusque descriptorum synonymicus et systematicus*,' tome ix., pars 1.

Election of Members.

The following gentlemen were severally balloted for and elected:—Mons. Henri de Saussure, of Geneva, as Honorary Member, in the room of Professor Pictet, deceased; Mons. E. Pictet, of Geneva, as Foreign Member; and Messrs. A. Phipson and G. W. Bird as Ordinary Members.

Exhibitions, &c.

Prof. Westwood exhibited a drawing of a variety of *Pyrameis cardui* that had long been in his possession, and which was captured many years since on Margate Sands by the late Mr. Desvignes.

Mr. Bond exhibited varieties of the following British Lepidoptera:— (1) *Lycæna Ægon*, female, having the right-hand wings plain brown, whereas those on the left-hand were blue: he at first thought it was what is commonly called a hermaphrodite, but it really was a female combining the two varieties of that sex in one individual: this was from the New Forest. (2) A fine variety of *Notodonta dodonea*, captured at Tunbridge in 1872. (3) A black specimen of *Acronycta megacephala*, bred near London in 1872. (4) A curious variety of *Miselia oxyacanthæ*, taken at Portsdown in 1872.

Mr. Bond also exhibited a new British species of Ichneumonidæ (*Anomalon fasciatum*), bred by Mr. Mitford from the cocoons of the supposed variety of *Lasiocampa trifolii* obtained from larvæ found at Romney, Hants. (*Vide* Proc. Ent. Soc. 1871, p. xxxix.)

Mr. F. Smith stated that Major Munn had asked him whether queen-bees ever sting? Mr. Smith said that he had once had a queen-bee on his hand for some time without the insect making the slightest attempt to sting; and Prof. Westwood said he had never been stung by one.

Mr. Champion exhibited two species of Coleoptera recently captured by him, and new to Britain, *viz.* *Thyamis distinguenda*, *Rye* (Ent. Monthly Magazine, ix. p. 157), from Box Hill, and *Lithocaris picea*, *Kraatz*, from Beaulieu.

Prof. Westwood exhibited drawings of Strepsiptera intended to illustrate Mr. S. S. Saunders' recently published monograph of the group.

Papers read.

The following papers were read:—

“Notes on the manner in which the ravages of a *Nematus* on *Salix cinerea* are checked by *Picromerus bidens*, *L.*” By Mr. Albert Müller.

“Descriptions of new genera and species of Tenebrionidæ.” By Mr. F. Bates.

“On some new species of extra-tropical South-African Butterflies.” By Mr. Roland Trimen.

“Catalogue of the Phytophagous Coleoptera of Japan, chiefly drawn up from materials collected by Mr. George Lewis.” First portion; by Mr. J. S. Baly.

“Supplementary notes on the genus *Acentropus*.” By Mr. J. W. Dunning.—*R. M'L.*

Catalogue of the Whales and Dolphins (Cetacea) inhabiting or incidentally visiting the Seas surrounding the British Islands.
By Dr. J. E. GRAY, F.R.S., &c.

(Continued from Zool. S. S. 3364.)

Section II. DENTICETE.

Teeth well developed in one or both jaws, sometimes deciduous. Palate without baleen. Head large or moderate, compressed. Tympanic bones two, dissimilar, separate, becoming united, sunk in a cavity in the base of the skull. Gullet large.

The geographical distribution of the toothed whales or dolphins is rather uncertain, from want of observations, and the evident gradual extermination of the species by the increase of navigation incident to the extension of commerce, and especially the use of steamboats, which disturb the breeding of these animals.

I believe that the porpoise (*Phocæna cōmunis*) is the only species that is a permanent resident here.

The Goose Whale (*Hyperoodon butzkopf*) often breeds in the country, but it is doubtful if it does not become gravid from the North Seas.

The Toothed Whales and Dolphins may be divided into three series:—

I. Those that live and breed in the arctic and the northern part of the Atlantic, some specimens of which proceed southwards after the herrings and other fish. They sometimes have their young on the British coasts, but I suspect that only a few, if any, of the specimens which come as far south as the British Channel ever escape being destroyed and find their way back to the Arctic Sea, as—

1. The Goose Whale (*Hyperoodon butzkopf*). A frequent visitor.
2. The Pilot Whale (*Globiocephalus Svineal*), which comes in large "schools" to the North of Scotland, and smaller groups or single individuals further south.

3. The Black Fish (*Physeter tursio*) is described from a specimen long ago taken on the coast of Scotland.

4. The Euphrosyne (*Clymenia Euphrosyne*) and (5) the White-beaked Bottle-nose (*Lagenorhynchus albirostris*) inhabit the North

Seas, and specimens have been found on the east coast of England.

6. Eschricht's Dolphin (*Electra acuta*), the White-sided Bottle-nose (*Leucopleurus arcticus*), and (7) the White-beaked Bottle-nose, natives of the Arctic Seas, have also been taken in the Orkneys.

The Black Fish (*Pseudorca crassidens*), natives of the North Sea, have been found in a semi-fossil state in Lincolnshire.

The Beluga or White Whale (*Beluga catodon*) and the Narwhal are natives of the Arctic Seas, and sometimes occur on the coast of Scotland.

The Killers (*Orca*) inhabit the Arctic Seas, but they often come to the south, even to the British Channel. These species are said to live as far south as the Mediterranean Sea, but it is to be determined if those of the north and of the south are the same species.

The Ziphius (*Ziphius Sowerbiensis*) has been so little observed that it is difficult to determine its native country. It may be a native of the Atlantic on the west coast of Ireland, for that is the district where it has been observed most frequently, but as yet only males. Single individuals have been obtained in the North of Scotland, on the coasts of Belgium and of France: the two latter were females.

II. Species that live in the southern part of the Atlantic or Mediterranean. Individuals sometimes wander north to the British Channel and even to the North Sea:—

The Grampus (*Grampus Cuvierii*). The Dolphin (*Delphinus delphis* and *Petrorrhynchus cavirostris*).

III. Species that inhabit the tropical seas of both hemispheres, and wander occasionally both to the north and to the south, to their own destruction, as for example:—

The Sperm Whale (*Catodon macrocephalus*), of which a single specimen sometimes occurs in the North of Scotland, probably carried there by the Gulf Stream. Others have occurred in the British Channel, &c.

Division I. *Nostrils longitudinal, parallel, or diverging, each covered with a valve, the right one often obliterated.*

Sub-Order III. PHYSETEROIDEA.

Head blunt; teeth many in lower jaw, fitting into holes in the gums of the upper ones. Cervical vertebræ more or less anchylosed.

Family IV. CATODONTIDÆ.—Head very large, compressed, truncated in front. Mouth inferior, linear. Pectoral fin short, broad, truncated. Dorsal hump rounded. Skull elongate; crown concave, surmounted by a high perpendicular wall, formed of the doubled-up maxillæ and occipital bones.

i. CATODON.—Atlas vertebra transverse, nearly twice as broad as high. Central canal subtrigonal, narrow below. Skull nearly two-thirds the entire length of the body.

It has been said I should use the name *Physeter* for this genus by modern biologists, who seem to pay more attention to what a specimen is called than to what it is. Artedi established two genera, *Catodon* for the sperm whale and *Physeter* for *Tursio*. Linnæus, in his twelfth edition, united the two genera into one under the name of *Physeter*. Now that they are separated I think that Artedi's old name ought to be used.

1. *Catodon macrocephalus* (Sperm Whale), Gray, Cat. Seals and Whales, p. 202, fig. 54. *Physeter macrocephalus*, Flower, Trans. Zool. Soc., vi. p. 309, t. 55—61, and woodcuts.—Inhabits tropical seas, and accidentally temperate ones. Teignmouth; *Gessner*, 1532. Whitstable Bay, 1794. Scotland; *Sibbald*. Thurso, 1863 (skeleton Brit. Mus.)

Family V. PHYSETERIDÆ.—Head depressed, rounded in front. Blowers linear (often only the one on the left side open), at the back of the forehead. Mouth small, inferior, rounded. Dorsal fin compressed, falcate. Pectoral fin elongate, falcate. Skull short; crown concave; hinder part of the wall formed by the maxillaries, and divided, as it were, into two subequal parts by a central bony ridge, which is more or less twisted towards the right side. Upper jaw toothless. Atlas and cervical vertebræ all united into a solid mass.

i. PHYSETER.—Head large, rather depressed in front.—Cat. of Cet. B. M., t. ii. f. 4, head (from Sibbald). Skull ———?

1. *Physeter tursio* (Black Fish). *Physeter tursio*, Linn.; Gray, l. c., p. 212; Synops. Whales & Dolph. p. 4.—Inhabits North Sea. Scotland; *Sibbald*, 1687. Length 52 or 53 feet. This species is only known from Sibbald's description, but there are many other whales, like the flat-back (*Sibbaldius borealis*), which have only occurred so as to be zoologically examined once, even when there are persons in England, and in different parts of Europe and America, paying great attention to whales, and three other species of this family were perfectly unknown a few years ago.

Division II. *Nostrils both united into a single central transverse or crescent-shaped blower on the back of the crown.*

Sub-order IV. DELPHINOIDEA.

Nostrils two, united into a single central transverse or crescentic blower on the back of the crown. Teeth in both jaws permanent, or rarely deciduous by age. Pectoral fin lanceolate, ovate, or truncated. Head generally beaked. Dorsal fin falcate or wanting. Skull beaked; maxillary bone spread out over the orbit.

I. Pectoral fin elongate, obliquely truncated on the inner side. Fingers elongate, longer than the arm-bones, unequal; the second and third much the longest; the rest short. Fore-arm bones close together, only separated by a straight line. Carpal bones moderate, five or seven.

A. Pectoral fin on the side of the body. Second and third fingers of six or eight phalanges.

Family VI. DELPHINIDÆ.—Head beaked. Teeth in both jaws, conical or compressed, permanent, without any internal lobe, occupying nearly the whole length of the jaw. Back rounded, with a falcate dorsal fin; rarely absent. Skull with the maxilla expanded over the orbit, and more or less turned up on the edges.

Tribe I. DELPHININA.—Head beaked. Teeth conical. Beak of the skull elongate, longer than the brain-cavity, depressed, broad, shelving on the sides. Nasal triangle short. Symphysis of the lower jaw very short, sloping. Dorsal fin subcentral, rarely wanting.

i. **DELPHINUS**.—Beak elongate. Palate with a deep groove on each side behind. Dorsal fin distinct. Teeth small, slender, five or six in an inch. Fingers elongate, unequal; the second much the longest, 8- or 9-jointed; third elongate, about three-fourths the length; the rest short. Skull (Cat. Cet. B. M., t. 1, f. 3, t. vi. f. 3).

1. *Delphinus delphis* (the Dolphin).—Black, sides gray, beneath white. Beak of skull once and a half the length of the brain-case. Teeth $\frac{4}{5}$ or $\frac{5}{8}$. Inhabits Mediterranean and North Atlantic. Cornwall, after the mackerel and pilchards; *Couch*. Greenland; *Fabricius*.

ii. **CLYMENIA**.—Beak of skull elongate-depressed; palate flat, behind, without any lateral groove. Nasal triangle moderate. Dorsal fin distinct. Pectoral fin falcate; hand larger than the fore-arm bones. Skull elongate, slender; brain-case spherical; beak slender, elongate, longer than the brain-case; intermaxillaries convex. Teeth small, slender, five or six in an inch. The symphysis of the lower jaw short. The blowers are moderate.

1. *Clymenia Euphrosyne* (The Euphrosyne).—Beak of the skull once and three-quarters the length of the brain-cavity. Teeth six in an inch.—Gray, Zool. Erebus and Terror, tab. xxii. (skull). North Sea. East coast of England; skull in the Norwich Museum (*Brightwell*).

iii. **TURSIO**.—Beak short, thick, rather longer than the brain-case, conical, convex above, rounded. Palate flat behind, without any lateral groove. Teeth large, $\frac{2}{3}$ or $\frac{2}{5}$. Skull high. Blower large. Nasal triangle produced considerably before the notch.

1. *Tursio truncatus* (The Bottle-nose). *Delphinus tursio*, O. Fab. *D. truncatus*, Montagu, Vern. Trans. iii. tab. v. f. 3. Skull, aged, Suppl. Cat. Seals and Whales, p. 73, figs. 5 and 6.—Inhabits North Sea and Mediterranean. Mouth of the Thames, 1828; the Orwell, 1849. River Dart, Devonshire; *Montagu*. Skull in Brit. Mus. This species is found on the coast of France and the Mediterranean.—Gervais, Ostéogr. Cet., tab. xxxiv. figs. 3 and 9 (skull).

Tribe II. **LAGENORHYNCHINA**.—Head attenuated, beaked. Teeth conical. Beak of the skull as long as the length of the brain-case, broad, flat above; edges slightly reflexed and bent up in front of

the notch. Nasal triangle elongate. Symphysis of the lower jaw short.

iv. **ELECTRA**.—The beak of the skull very flat above, with the edges in front of the notches bent up. Teeth-line stopping considerably short of the notch.

1. *Electra acuta* (Eschricht's Dolphin). *Delphinus acuta*, Gray, Zool. Ereb. & Terror. *Delphinus Eschrichtii*, Schlegel, Abhand. tab. i. and tab. ii. fig. 5.—Beak of the skull rather longer (about one-third) than the length of the brain-case. Teeth moderate, four in an inch, those of the lower jaw rather larger. Inhabits North Sea. Orkneys; *Brook*. Færoe Islands; *Schlegel*. Skull in Mus. Leyden.

v. **LEUCOPLEURUS**.—Beak of the skull rather flat above and elongate, bent up on the edge in front of the notch, narrow behind, as long as, or slightly longer than, the length of the brain-case. Teeth-line reaching nearly to the notch. Teeth small, five in an inch. First and second cervical vertebræ united by their bodies; third and fourth by the spinous processes. Vertebræ 81: c. 7; d. 15; l. and c. 59.

1. *Leucopleurus arcticus* (White-sided Bottle-nose). Gray, Synopsis of Seals and Whales, tab. xii. (skull). *L. leucopleurus*, Gray, Zool. Ereb. & Terror, tab. xii.—Inhabits North Sea. Orkney; *Knox*, 1835.

vi. **LAGENORHYNCHUS**.—Beak of the skull rather flat above, bent up on the edges in front of the notch, deep, broad behind, rather shorter than the length of the brain-case. Teeth-line reaching nearly to the notch, large, three in an inch. First and second cervical vertebræ united by their bodies; the third, fourth, fifth, sixth and seventh free.

1. *Lagenorhynchus albirostris* (White-beaked Bottle-nose). *Delphinus tursio*, Brightwell, Ann. & Mag. N. H., 1846, t. 2.—Inhabits North Seas. Yarmouth, 1846; *Brightwell* (skeleton in Brit. Mus). Færoe Islands; *Schlegel*.

Tribe III. **PSEUDORCAINA**.—Head rounded in front, very convex, not beaked. Teeth conical. Beak of the skull depressed, broad, scarcely so long as the brain-cavity.

vii. **PSEUDORCA**.—Head rounded, convex; body moderate; dorsal

fin moderate, in the centre of the back; arm-bones very short and thick, the humerus rather the shortest. Teeth large.

1. *Pseudorca crassidens* (The Black Fish).—Beak about two-thirds the length of the brain-cavity, broad, rather tapering on the sides, truncated in front. Teeth $\frac{8}{8}$ $\frac{8}{8}$. Inhabits North Sea. Skull, Lincolnshire (semi-fossil).

Tribe V. PHOCÆNINA.—Lateral wings of the maxilla shelving down over the orbit. Triangle in front of the blowers convex. Teeth compressed.

viii. PHOCÆNA.—Dorsal fin distinct, in the middle of the back, with a series of small spines on the upper part of its front edge. Teeth all compressed, truncate.

1. *Phocæna communis* (the Porpoise).—Inhabits North Sea; near the shore in all seasons; ascends the rivers; frequent. Battersea, 1815; *Gray*.

B. Pectoral fin low down on the side of the body. The second and third fingers very long, of nine or twelve phalanges. Teeth only in front.

Family VII. GRAMPIDÆ.—Head rounded; forehead rather convex; teeth of upper jaw deciduous, of lower jaw only in front over the short symphysis. The dorsal fin low; the skull depressed; lateral expansions horizontal, bent down on the sides over the notch.

i. GRAMPUS.

1. *Grampus Cuvieri* (the Grampus). *Murie*, Journ. of Anat. and Phys. 1870, vol. v. tab. v. *Flower*, Trans. Zool. Soc.—Inhabits Mediterranean, Bay of Biscay. Isle of Wight, 1845; *Bury* (skull in Brit. Mus.) Coast of Cornwall. The French naturalists have made two species, *Delphinus griseus* and *D. Rissoanus*, and *Gervais*, in his 'Ostéographie,' figures the skeletons of both kinds. Mr. Flower, who examined an adult female 11 feet long, thinks they are the same. The differences between them are not great; the two specimens figured may belong to the sexes. It appears to be one of those species which inhabits the Mediterranean and the Bay of Biscay, and only comes north as far as the south of Britain incidentally, along with the mackerel.—*Proc. Zool. Soc.* 1870, p. 128.

Family VIII. GLOBIOCEPHALIDÆ.—Head blunt, rounded. Teeth in the front part of both jaws, cylindrical, simple; symphysis very short, shorter than the tooth-line. Dorsal fin falcate. Pectoral fin low down on the sides of the body; fingers elongate, many-jointed. Atlas and the rest of the cervical vertebræ united, or the hinder one free. Scapula triangular, with large coracoid and acromion processes.

i. GLOBIOCEPHALUS.—Skull: palate flat; beak tapering in front; fifth and sixth cervical vertebræ anchylose.

1. *Globiocephalus srineval* (Pilot Whale).—Black, with a white streak beneath. Inhabits North Sea. Orkneys; *Trail* (skull in the British Museum). Færoe Islands. Makes a passage annually from the Polar Seas to the Atlantic. Comes in large “schools” on the coast of Scotland, and is driven ashore by the fishermen. The bones saved are imported to the east coast of England to make manure. Small “schools” or isolated stragglers occur annually on different parts of the coast. They often reach 20 to 22 feet long.

2. *Globiocephalus affinis*.—Inhabits North Sea. Skull, Mus. Coll. of Surgeons.

ii. SPHÆROCEPHALUS.—Palate of the skull convex, shelving on the sides. Beak oblong, of nearly the same width the greater part of its length.

1. *Sphærocephalus incrassatus* (Thick-palated Pilot Whale). Gray, Proc. Zool. Soc. 1861, fig. 3.—Inhabits British Channel. Skull, Bridport, 1853. B. M. Beacham. Probably a species of the Mediterranean.

II. Pectoral fin broad, rounded or truncated at the end; hand shorter than the arm-bones; second finger the longest, the rest gradually shorter; phalanges of the second finger six or eight.

Family IX. ORCADÆ.—Head rounded, scarcely beaked. Dorsal fin falcate. Skull heavy; wings of sides expanded; beak short, broad; triangle in front of the blowers flat. Lower jaw thick in front; symphysis short. Teeth large.

i. ORCA.—Beak of the skull from the notch before the orbit the same length as from the notch to the condyles; the width at the notch three-fifths of the length of the beak. The occipital end of

the skull slightly concave. Condyles of moderate size. Lower jaw broad on the sides, very thick and solid in front.

1. *Orca stenorhyncha* (Sharp-nosed Killer).—The beak of the skull tapering and narrow in front; end narrow. Suppl. Cat. Seals and Whales, p. 90, figs. 7 and 9 (skull). Inhabits British Channel (skeleton from Weymouth), and Sweden.

2. *Orca latirostris* (Broad-nosed Killer). *Delphinus Orca*, Cuvier, Oss. Foss. v. tab. xxii. f. 4 (skull).—Beak of the skull spatulate; side of the hinder half nearly parallel, of the front half arched and converging; end rounded, middle rather wider at the notch. Inhabits North Sea. Skull from coast of Essex, British Museum.

Eschricht observes that the fierce nature of the Orcas is perfectly true, and that they partly subsist on large fish. They attack and tear to pieces the very largest whalebone whales to feed on their blubber, and they swallow porpoises and seals whole, and have been known to eat as many as four, one immediately after the other, and as many as twenty-seven in a few days; but they are very much afraid of the walrus. M. Eschricht seems to think there are two species of *Orca*, one with a high and the other with a low fin, and a third from the Færoe Islands. Prof. Steenstrup proposes to call the third *Orca Eschrichtii*, but he certainly does not give any characters by which these species are to be separated; indeed Eschricht was an excellent anatomist and physiologist, as regards the Cetacea, but he was an industrious compiler as regarded their history, and seemed to have little knowledge of zoological distinctions.

The “killers” of the North Sea, of the west coast of France, and of the Mediterranean have very similar skulls, but they differ greatly in size, becoming smaller as they are found further south. They may be different species or only geographical varieties.

Family 10. BELUGIDÆ.—Head rounded in front. Teeth in both jaws more or less early deciduous, rarely wanting, or rather not developed. Back without any dorsal fin. Pectoral fin small, ovate. Skull with the lateral expansion of the maxilla over the orbit and the side of the beak, shelving downwards. Fingers short; index and middle fingers nearly the same length; the rest rather shorter; phalanges 2, 5, 6, 4, 3. Cervical vertebræ generally free; the second with a large dorsal process.

i. **BELUGA**.—Male without any spiral horn-like tooth. Fingers short. Metacarpal bones surrounded with cartilage. Blade-bone with a large coracoid and acromion process. Second cervical vertebra with a large dorsal process.

1. *Beluga catodon* (the Beluga or White Whale).—Inhabits North Seas, entering the mouths of rivers in “schools.” Scotland; *Sibbald*. Mr. Cope has divided the arctic specimens into four species, from slight differences in the attachment of the cervical vertebræ, the number of ribs, and the form of the acromion.

ii. **MONODON**.—Male with one very long, projecting, spiral tusk in the left side of the upper jaw. Rarely the tusks on both sides are developed, and they rarely occur in the female. Cervical vertebræ: first free, thin; second and third united by the spinal processes. Bladebone with large coracoid and acromion process. Fingers short.

1. *Monodon monoceros* (the Narwhal).—Inhabits Arctic Ocean, incidentally on the coasts of Scotland and England, and Isle of May, 1648; Zetland, 1808; Lincolnshire, 1800.

Sub-order V. ZIPHIOIDEA.

Head beaked. Nostrils two, united into a single transverse or crescent-like blower on the centre of the back of the crown. Teeth only in the front or sides of the lower jaw, fitting into pits in the upper one. Dorsal fin falcate. Pectoral fin ovate, small, low down on the side of the body; fingers short, four- or five-jointed; second and third the longest; fourth rather shorter; first and fifth rather short. Cervical vertebræ more or less united into one mass.

Allied to the Physeteroidea, but with a transverse instead of a longitudinal nostril. Indeed these sub-orders form two parallel series. (See Suppl. Cat. Seals and Whales, 1871, p. 57.)

Family XI. **HYPEROODONTIDÆ**.—Beak of the skull with a high crest on each side above, formed by the elevation of the maxillary bones in front of the blower. Teeth two or four in front of the lower jaw, cylindrical, conical. Cervical vertebræ united into one mass.

O. Fabricius and Turton by mistake state the teeth to be in the *upper* jaw, and Illiger's name is founded upon this error of the press.

i. **HYPEROODON**.—Beak of the skull bent downwards; crest of the back of the beak sharp-edged above, as high as the occiput.—Gray, Cat. Cet. B. M. t. 7, f. 1.

1. *Hyperoodon butzkopf* (the Goose Whale).—Inhabits Arctic Seas, frequent in the British Seas, and ascending rivers. London Bridge, 1837; Belfast, 1848; Frith of Forth, 1839.

ii. **LAGENOCETUS**.—Beak of the skull straight; crest very large, flattened, higher than the occiput.

1. *Lagenocetus latifrons*, Gray, Zool. Ereb. & Terror, t. 24 (skull).—Inhabits Arctic Seas; occasionally on the coast of Scotland and England. Frith of Forth, 1846; Orkneys (skull, Brit. Mus.) Moreton Bay. Færoe Islands (Mus. Edinb., 25 feet long).

Family XII. **EPIODONTIDÆ**.—Blower lunate. Skull: beak simple; maxillaries not dilated above; intermaxillaries enlarged behind, forming a more or less deep cavity round the nostrils. Teeth two or four in front of the lower jaw, conical or cylindrical. Cervical vertebræ: first, second and third united into one mass, which is produced and truncated above; the rest thin, free.

i. **PETTORHYNCHUS**.—Skull trigonal. Vomer swollen, forming a large elongated callous tubercle between the intermaxillaries. Intermaxillaries forming a deep basin round the nostrils.

1. *Petrorhynchus cavirostris*. *Ziphius cavirostris*, Cuvier, Oss. Foss. v. p. 320, t. xxvii. f. 3 (skull). Gervais, Zool. et Paléont. Franc. t. 38, f. 2, t. 39, f. 1. Ostéogr. Cét. t. xxi. f. 6—9. Fischer, Ann. & Mag. Nat. Hist. 1866, xviii. p. 255. *Hyperoodon de Corse*, Doumet, Bull. Soc. Cuvier, 1842, p. 207, t. 1, f. 1 (animal). *Hyperoodon Doumetei*, Gray, Cat. Cet. Brit. Mus. p. 68. *Petrorhynchus mediterraneus*, Gray, Suppl. Cat. Seals & Whales, p. 98. Specimen caught at sea at Shetland, 1870 (skull in Mus. Edinb.), Turner.

Epiodon Gervaisii, *Heroodon Gervaisii*, Duvénoy. *Epiodon Heraultii*, Gray. *Delphinus Philippii*, Coues. Erichs. Archiv. Nat. 1846, p. 204, t. 4, f. 6, from Messina. *Epiodon Desmarestii*, Gray, Suppl. Cat. Seals and Whales, p. 98 (from *Z. cavirostris*—part), Gervais, Zool. et Paléont. Franc. t. 38, f. 1, t. 39, f. 2—7. Ostéogr. Cét. t. 21, f. 1—4, t. 22, f. 4—11. Differs in having a small slender simple vomer.—Inhabits Mediterranean, and I have seen an imperfect skull said to be brought from the

North Sea, perhaps from the coast of the British Islands. It occurs in Sweden. Gervais considers the development and callosity of the vomer on which the genera *Epiodon* and *Petro-rhynchus* had been founded merely an accidental variety. It may be sexual, but I believe it to be distinctive, as its non-development is characteristic of *Epiodon australis*, and the development of *P. capensis*. I had believed it might be sexual, but the inner edge of the intermaxillaries of the animal figured by Doumet, which appears to be that of a female, figured by Gervais, is dilated and raised, which shows it is not a character of the female sex.

Aliama Desmarestii, Gray, from *Delphinus Desmarestii*, Risso, Hist. Nat. Eur. Merid. iii. p. 24, t. 2, f. 3 (female), from Nice, peculiar for having a long, conical head and large fins, is an animal that is quite unknown to modern zoologists. It has the long fins on the lower part of the side of the body of the grampus, the teeth of Ziphioid whales, and a conical head peculiar to itself.

Family XIII. ZIPHIIDÆ.—Skull beaked. Maxillaries not dilated above. Intermaxillaries linear, rather swollen on the sides of the nostrils. Teeth on the side of the lower jaw compressed. Cervical vertebræ more or less united into a consolidated mass.

i. ZIPHIUS.—Teeth two, in the middle of the sides of the lower jaw. Teeth of the male large, short, compressed, truncated at the end; of female small, curved. Lower jaw often with sundry rudimentary teeth, gradually tapering in front. Symphysis elongate, and reaching to the middle of the teeth in the male, and beyond it in the female. Cervical vertebræ free. Scapula with large coracoid and acromion processes.

1. *Ziphius Sowerbiensis* (the Ziphius).—Inhabits British Channel, Irish Sea, and North of Scotland. Elginshire, 1800 (male); *Brodie*. West coast of Ireland (males); *Andrews*. West coast of France (females); *Blainv*. Ostend; *Dumortier*.

The *Neoziphius europæus*, the skull of which is figured as *Diplodon europæus*, *Gervais*, Ostéog. Cét. t. xxiv., is also found on the Coast of France, and may very likely occur on the British coast. It is immediately known by the very short symphysis of the lower jaw, and the teeth being very near its front end.

It is curious that Linnæus, in the 'Fauna Suecica' (1861) gives *Monodon monoceros* and *Balaina mysticetus* as inhabiting the

Atlantic Ocean, *Balæna physalis* and *Catodon macrocephalus* as inhabiting the Norwegian seas, *Delphinus delphis* the western seas, and *Delphinus phocæna* as common to all seas.

J. E. GRAY.

November 5th, 1872.

Erratum.—Zool. S. S. 3360, line 10, for Southern Ocean read German Ocean.

Some additional Remarks on the Question of the Colouring of Cuckoos' Eggs. By the Rev. A. C. SMITH, M.A.

IT may be in the recollection of some of the readers of the 'Zoologist,' that, five years since, I invited the attention of British ornithologists to the exceedingly interesting theory of Dr. Baldamus, in regard to the colouring of the eggs of the cuckoo,* and that I followed up my remarks in a subsequent number with a translation of the whole article in question from Naumannia;† when I entreated the careful consideration of English naturalists upon a subject, which, however startling from its then novelty, yet contained a very beautiful theory, and one which at all events demanded respect from the well-known scientific attainments of its author.

I am afraid, however, that in England this question has not attracted the attention it deserved; for beyond an occasional passing allusion to it from time to time in our Natural History periodicals, and a few, a very few, but highly valued facts, all tending to corroborate the view of Dr. Baldamus, which I have received from obliging correspondents, I have been unable to find that anybody in this country has handled the subject since my last paper in 1868, for Mr. Rowley's article on "Certain Facts in the Economy of the Cuckoo," appeared previously in the 'Ibis';‡ and though that gentleman was then unconvinced, and felt compelled to withhold his belief from it, he expressed great admiration (not only of the Doctor's researches, but) of his theory, which he described "as beautiful as it is new," and even added, "I only wish that fresh evidence may be brought forward of a nature so strong as to make it an acknowledged fact."

Now I attribute the general apathy on the part of our British

* 'Zoologist' for 1868, S. S. pp. 1105—1118.

+ Id. pp. 1145—1166.

‡ 'Ibis' for 1865, S. S. vol. i. pp. 178—186.

ornithologists, in regard to the above-named theory, partly to an indolent reluctance to embark on a subject which, to be rightly investigated, would require a great deal of careful pains-taking, and very persevering diligence, and partly to the (as I venture to think) unworthy sneers with which some would-be leaders in the Ornithological world tried to annihilate the learned German Doctor, and my humble self also, his mere introducer; but inasmuch as ridicule is not argument, and no champion arose to account for the facts and combat the inferences of Dr. Baldamus, methought a well-known maxim of the English law-courts was not irrelevant,—“When the counsel for the defence sees his case is bad, let him abuse the plaintiff’s attorney.” Hence my share in the obloquy so freely poured forth on this question in certain quarters.

However, so far as simple ridicule went, that would have been quite harmless, had it not been accompanied, doubtless from pure pleasantry, with an ingenious perversion of the theory; and it was certainly easy, and perhaps exceedingly witty, to say that Dr. Baldamus asserted the cuckoo to have the power of laying her egg of just what colour she pleased; only such pleasantry becomes mischievous in a scientific subject, inasmuch as it exactly contradicted the Doctor’s expressed view. I am not about to repeat the argument, for which I would refer to the translation alluded to above, or still better to the original;* I will here, and to avoid misapprehension, merely quote the summary of Dr. Baldamus’s view of the question, as he puts it; for having “set forth as a law of Nature that the eggs of the cuckoo are, in a very considerable degree, coloured and marked like the eggs of those birds in whose nests they are about to be laid, in order that they might the less easily be recognized by the foster-parents as substituted ones,” he goes on to declare his opinion, “that every hen cuckoo lays all her eggs of one colouring only, and consequently (as a general rule) lays only in the nests of one species.”

Having now entered my most decided protest against the very unphilosophical way of getting rid of an unpalatable theory by ridicule and perversion rather than by reason and argument, I come to the subject-matter in hand, and that is to submit to the readers of the ‘Zoologist’ a mass of evidence on the point collected in Germany; for if English ornithologists have shown themselves

* 1853, pp. 307—326.

remiss on the subject, assuredly our more pains-taking and enquiring German friends have not; and I proceed to produce from the pages of the 'Journal für Ornithologie' for 1871* some very valuable statistics on a large series of cuckoos' eggs, given by Dr. E. Rey, from specimens in his own collection, all of which were obtained either by himself in the neighbourhood of Halle, or by a friend in Dessau, so that he is able to rely upon his facts as authentic.

Dr. Rey modestly begins by desiring to contribute a little mite to the history of the propagation of the cuckoo, in connection with the interesting observations of Baldamus and others, and says that "amongst his cuckoos' eggs many are found whose colouring and (foster) parentage speak very much for that theory;" and adds that "amongst these he reckons also the cases where the cuckoo's egg did not indeed occur in a nest of the species whose eggs it resembled in colour, but where a cuckoo's egg was introduced which corresponded with those of some allied and similarly-building species of warbler."†

The author then goes on to discuss the question of blue and bluish green cuckoo's eggs, eggs of which colour alone (as he affirms) the cuckoo places in the nests of *Ruticilla phœnicurus*, and while they are also found of this colour in the nests of the hedgesparrow and the whinchat, in the nests of no other birds, to which the cuckoo is accustomed to entrust her eggs, are they ever found; and this "striking phenomenon," he suggests, can be best explained by accepting the theory of Baldamus.

There is one more preliminary remark, in reference to the blue cuckoo's eggs, which I cannot forbear to quote, because it advocates a principle to which I have often called attention in the pages of the 'Zoologist' and elsewhere, *viz.*, the valuable testimony which

* Pp. 225—228.

† It is, perhaps, worth while to remind my readers, that the argument here, as expressed originally by Baldamus, is, that though for the most part the cuckoo finds the nest of that species of warbler which it requires for its peculiar circumstances, it will oftentimes happen that it does not find such nests in the necessary numbers, or sufficiently advanced or retarded for its purposes:—"It will, therefore, be unable to find for each of its eggs a fitting nest of that species to which it was prepared to entrust it, and to which it was used; so it finds itself obliged to introduce one and another egg into the nests of some other warblers, if haply by good chance it can do so. Thus, then, it comes to pass that there are, and according to the nature of circumstances there must be, *proportionably many exceptions* of the rule."

may be derived from comparing the texture, or *the grain*, of the shell; and Dr. Rey says that, in reply to the argument that these blue so-called cuckoos' eggs may perhaps be gigantic eggs of the redstart, he maintains that "in respect of the grain [das Korn], in which they exactly agree with one another, these blue cuckoos' eggs vary in every case from the eggs of the redstart.

I proceed to the Catalogue, observing by the way how carefully and minutely our author has tabulated the statistics of every nest described; showing first with regard to the *foster-parents* :—

- (a) The species.
- (b) The date of finding.
- (c) The number of the eggs.
- (d) The colouring and markings of the eggs.

And then with regard to the cuckoo's egg found therewith :—

- (e) The number.
- (f) The size in millimètres.
- (g) The colouring, &c.

a method of investigating the question before us, which leaves nothing to be desired, and an example of patient pains-taking, and accurate examination of details very highly to be commended, and which I venture to point out as worthy of imitation, inasmuch as it is by a careful scrutiny of the details of individual specimens, and then by a cautious comparison of many such examples, that anything like a correct opinion on such a disputed point can be obtained.

Current No.	Owner of nest.	Date.	No. of eggs in nest.	Markings.	Cuckoos' egg.	Size in millimètres.	Remarks.
1	Lanius collurio	June 9	2	Red sort	1	22, 16	{ Very like L. collurio, the brown sort. Colouring and marking between F. cœlebs and F. chloris.
2	" "	June 13	1	" "	1	21, 16	
3	" "	June 20	4	" "	1	22, 17	{ Like L. collurio, brown sort.
4	" "	June 20	5	Brown sort	1	23, 17	{ Between L. collurio and S. hortensis.
5	" "	July 11	2	Red sort	1	22, 16	{ Very like L. collurio, brown sort.
6	" "	?	0	?	2	21, 16	{ Reminding one of L. collurio and S. hortensis; perfectly agreeing amongst themselves.
7						21, 16	

Current No.	Owner of nest.	Date.	No. of eggs in nest.	Markings.	Cuckoos' egg.	Size in millimetres.	Remarks.
8	<i>Lanius collurio</i>	?	?	?	1	22, 16	{ Like <i>L. collurio</i> , brown sort.
9	<i>Ruticilla tithys</i>	June 19	2	.. ..	1	20, 15 _s	{ Pure white ground colour, with in parts somewhat large, indistinct, rust-red spots, which appear but a little thicker towards the large end.
10	{ <i>Ruticilla phœ-nicurus</i> }	May 22	6	.. ..	1	22 _s , 17	{ Paler than <i>R. phœnicurus</i> .
11	" "	May 22	6	.. ..	1	22, 16	" "
12	" "	May 24	5	{ Spotted with red }	1	22, 16 _s	{ Observably paler than <i>R. phœnicurus</i> .
13	" "	May 26	4	.. ..	1	22, 17	{ A little lighter than <i>R. phœnicurus</i> .
14	" "	May 28	6	.. ..	1	21, 16 _s	Paler than <i>R. phœnicurus</i> .
15	" "	June 13	5	.. ..	1	22, 16 _s	" "
16	" "	June 20	4	.. ..	1	23, 16	Like <i>R. phœnicurus</i> .
17	" "	July 1	3	.. ..	1	22, 16	Paler than <i>R. phœnicurus</i> .
18	" "	July 6	4	.. ..	1	22, 16	" "
19	" "	?	?	.. ..	1	23, 17	" "
20	" "	June 11	4	{ With a large circle of red spots }	1	22 _o , 15 ₇	Uniformly blue-green.
21	{ <i>Erithacus rubecula</i> }	May 20	4	.. ..	1	22 _o , 16 ₇	Like <i>S. hortensis</i> .
22	{ <i>Calamoherpe arundinacea</i> }	June 15	3	.. ..	1	22 _s , 16	{ Like <i>Calamoherpe palustris</i> .
23	" "	?	6	3	.. ..	24, 16	{ Tolerably like <i>C. arundinacea</i> .
24	" "	July 15	3	.. ..	1	23, 17 _s	" "
25	" "	?	2	.. ..	1	22 _s , 17	Like <i>C. arundinacea</i> .
26	" "	?	4	.. ..	1	23 _s , 16 _s	Like <i>S. nisoria</i> .
27	{ <i>Calamoherpe Phragmitis</i> }	June 28	4	.. ..	1	22, 16 _s	Like <i>C. Phragmitis</i> .
28	" "	?	1	.. ..	1	22, 16 _s	Like <i>S. hortensis</i> .
29	{ <i>Calamoherpe palustris</i> }	June 4	4	.. ..	1	21 _o , 15 _s	Like <i>S. cinerea</i> .
30	{ <i>Calamoherpe turdoides</i> }	June 14	4	.. ..	1	22 _s , 16 _s	Like <i>S. hortensis</i> .
31	{ <i>Phyllopneuste sibilatrix</i> }	May 28	5	.. ..	1	22 _o , 16 ₇	Uniformly pale blue.
32	<i>Sylvia nisoria</i>	May 21	3	.. ..	1	22, 16 _s	Like <i>S. hortensis</i> .
33	" "	May 30	3	.. ..	1	21 _s , 17	" "
34	" "	June 2	2	.. ..	1	22, 17	" "
35	" "	June 8	2	.. ..	1	....	Like <i>S. nisoria</i> .
36	" "	June 8	2	.. ..	1	22 _s , 17	Like <i>C. Phragmitis</i> .
37	" "	June 11	4	.. ..	1	22, 17	Like <i>S. hortensis</i> .
38	" "	?	3	.. ..	1	22, 15	" "

Current No.	Owner of nest.	Date.	No. of eggs in nest.	Markings,	Cuckoo's egg.	Size in millimètres.	Remarks.
39	<i>Sylvia cinerea</i>	May 17	5	..	.. 1	21, 16	Like <i>S. cinerea</i> .
40	" "	May 20	5	..	.. 1	22, 16 _s	Like <i>S. hortensis</i> .
41	<i>Sylvia hortensis</i>	May 28	2	..	.. 1	21, 16	" "
42	" "	June 5	1	..	.. 1	22, 16 _s	" "
43	" "	June 6	5	..	.. 1	21, 16	Like <i>S. cinerea</i> .
44	" "	?	2	..	.. 1	21, 16 _s	Like <i>S. hortensis</i> .
45	" "	?	?	..	.. 1	24, 16 _s	" "
46	<i>Motacilla alba</i>	May 19	5	..	.. 1	22, 17	Like <i>S. cinerea</i> .
47	" "	May 20	4	..	.. 1	22, 16 _s	Like <i>S. hortensis</i> .
48	" "	May 25	6	..	.. 1	22, 16 _s	Very like <i>M. alba</i> .
49	" "	May 26	2	..	.. 2	22, 16 _s	{ Both like <i>S. cinerea</i> , but differing from one another.
50	" "	....	..	..	..	23, 17	
51	" "	June 1	5	..	.. 1	20 _s , 16	Like <i>S. cinerea</i> .
52	" "	June 3	3	..	.. 1	24, 16 _s	{ Somewhat like <i>C. arun-</i> <i>dinacea</i> .
53	" "	June 6	5	..	.. 1	23, 16	
54	" "	June 10	5	Varying	1	24, 17	Like <i>M. alba</i> . Unlike the eggs of this clutch, but very like the normal eggs of <i>M. alba</i> .
55	" "	June 12	5	..	.. 1	22, 17	Like <i>M. alba</i> .
56	" "	June 19	5	..	.. 1	23, 17	" "
57	" "	June 20	4	..	.. 1	23, 16 _s	Like <i>C. arundinacea</i> .
58	" "	June 20	6	..	.. 1	21, 16 _s	Like <i>M. alba</i> .
59	" "	June 22	4	..	.. 1	22, 16 _s	Like <i>S. cinerea</i> .
60	" "	?	2	..	.. 2	23, 17	{ Like <i>S. cinerea</i> , but differing widely from each other.
61	" "	....	..	..	..	22, 17	
62	<i>Alauda cristata</i>	?	1	..	.. 1	23, 16 _s	Like <i>M. alba</i> , the ground colour some- what pale.
63	{ <i>Emberiza</i> <i>citrinella</i> }	June 5	4	..	.. 1	20 _o , 15 _s	{ Of pale clay-yellow ground colour, with many large rust- yellow spots; even marked with similar lines and points, and with detached pale violet-green spots.
64	{ <i>Fringilla can-</i> <i>nabina</i> }	May 29	5	..	.. 1	21 ₁ , 16	
65	" "	?	4	..	.. 1	22, 17	{ Somewhat like <i>M. flava</i> ; also reminding one of very dark <i>S. nisoria</i> . Like many of <i>C. phrag-</i> <i>mitis</i> .

Dr. Rey then appends a second catalogue of cuckoos' eggs, which have been collected from other places and by other people, and of whose (foster) parentage trustworthy testimony is wanting to

him; but he adds, "they may through their resemblance be easily classified with the other eggs."

No.	Size.	Remarks.	No.	Size.	Remarks.
1	22, 16 ₅	{ Like <i>L. collurio</i> , the brown sort.	19	21, 16 ₅	{ Like <i>S. hortensis</i> , approaching <i>S. atricapilla</i> .
2	21, 16		20	24 ₂ , 16	
3	21 ₅ , 17	{ Reminding one of <i>Emberiza hortulana</i> .	21	24 ₅ , 17	
4	22, 16 ₅	{ Not unlike <i>Alauda arvensis</i> .	22	22 ₅ , 16	{ Very like <i>S. curruca</i> . Both of these were received at the same time and from one place.
5	22, 16 ₅		23	21 ₅ , 15 ₅	
6	22 ₅ , 17		24	21, 16	{ Like <i>Ruticilla phoenicurus</i> . This egg in colouring and marking stands midway between <i>S. locustella</i> and <i>S. hypoleis</i> .
7	23, 17		25	22, 17	
8	22, 16		26	22, 16	{ Somewhat like <i>Anthus arboreus</i> , with a slate-gray bluish ground-colour. These three eggs, which agree with one another quite remarkably, I received through one hand; but (alas!) provided with no further information than the dates May 25, May 30, and June 8, 1869.
9	22 ₅ , 16 ₅				
10	22 ₅ , 16	{ Like <i>Motacilla alba</i> .			
11	22 ₅ , 16				
12	22, 15 ₅	{ Like <i>Motacilla flava</i> .	27	22, 17	
13	20 ₅ , 16		28	21, 17	
14	21, 16 ₅		29	22, 17	
15	23, 17	{ Like <i>S. cinerea</i> .			
16	20, 16				
17	22, 17				
18	23, 17				

It will be needless for me to add any further observations on this valuable catalogue; I would merely beg to commend the study of these tables (containing a description of a series of nearly a hundred cuckoos' eggs, collected with great care and assiduity during seventeen years) to all those who take interest in the subject; and if Mr. Rowley could be induced to give his opinion upon them, I for one should be exceedingly grateful to him, inasmuch as both he and I are only desirous to elicit the truth of the matter; and the more such a question is discussed and ventilated, the more likely we are to arrive at a true verdict in the case.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
February 8, 1873.

Ornithological Notes from Castle Eden.

By Mr. JOHN SCLATER.

Black Tern.—On the 22nd of October last a black tern was brought to me, which had been shot near Castle Eden a day or

two before: it was flying alone. This is the first time I have seen or heard of the species near here. I am told that it was common on the Northumbrian coast forty years ago. The specimen was a male, and from the plumage I think a bird of the second year.

Fulmar Petrel.—Nov. 16. A fulmar petrel was brought to me which had been picked up on the beach; it was much decomposed, but the feathers were tight. I buried it in quick-lime for two days, and have succeeded in making a fair mounted specimen of the skeleton.

Waxwings.—Nov. 17. I saw three waxwings: the first I observed roosting on a thorn overhanging the park-gate, where it no doubt had been feeding on the haws. My first thought was, my gun; but the church-bells were ringing close by, and I have never learned to shoot on a Sunday. I confess this temptation was not easily overcome; however, I tried to knock it down with a stone, but missed, of course: it flew up and joined two others on the top of a tall ash, where they were feeding on the buds. I consoled myself by having so good an opportunity of watching their habits, and as one of them was lazy enough to roost at 2.45 P. M., I thought they might be there in the morning: this turned out to be true. I went at daybreak next morning, and directly saw one of them on the very top branch of a large beech. I fired, and it flew towards me, falling dead at my feet, in beautiful condition. At 11 A. M. I found the other two at the same place feeding on the haws. I shot one; the other got away, and I have not seen or heard of it since. The two I obtained were male and female. There was scarcely any difference in their plumage, but the female was rather the larger: both birds had six waxen appendages to each wing. It is stated in Yarrell that the female has never more than five; and the account there given of their shy and restless habits are totally at variance with what I observed. They sometimes sat perfectly motionless; their position was then very smart and upright, but rather round-shouldered, the crest pointing upwards and the beak inclined downwards. When feeding they kept uttering a sort of mournful note, not unlike what I have heard the female robin make in the breeding-season, and they much reminded me of the slow, lazy-looking manner of the bullfinch. It may be said that these birds had probably just arrived and were fatigued; but some years ago a game-watcher here met with seven feeding on the berries of the mountain-ash, when they allowed him to approach them quite

close, seeing which he went home for his gun, but when he returned he found them sitting on the top branches of another tree: he shot one, when they flew a short distance and alighted; they allowed him to approach as before, when he shot a second; and so on until he shot four: he said they sat and looked at him while loading. Surely a bird cannot be called shy that sits within shot and allows a man to go through the platoon of a muzzle-loading gun, time after time. The watcher's character of them, if rough, was most truthful; he said they were "stupid devils." The other three flew into the gardens, and two of them were shot by the gardener in a similar manner. All these six birds came into my possession. I venture to state that the majority of the specimens obtained in Britain have been shot sitting: if any readers of the 'Zoologist' can prove the contrary, I hope they will.

Great Gray Shrike.—Nov. 29. A neighbouring gamekeeper brought me a fine specimen of the great gray shrike: on dissection I found the stomach to contain the stomach and intestines of a small bird, probably a finch, as it contained various seeds and pebbles. This is the fourth specimen I have obtained during six years in this neighbourhood, and all four have allowed themselves to be openly approached and shot sitting.

Glaucous Gulls.—Dec. 13. I obtained three glaucous gulls, all immature birds, differing in size, the largest being twenty-seven inches in length, the smallest twenty-five inches and a quarter. There is scarcely any difference in their plumage, except in the wing-feathers: in the smallest bird the outer primary is uniform dull white, with a small angular mark of pale brown near the tip; the inner webs are all dull white, but the outer webs become more and more pale yellowish brown, and the angular mark increases in size towards the body. In the largest the primaries are rather darker; the outer webs are mottled with pale brown and a double row of angular markings near the tip. The under surface of the wing of all the birds is uniform grayish white, the shafts pure white. There were several adult birds, but I was not fortunate enough to get near them. I got a fine adult specimen of the great black-backed gull. There are more of the larger species of gulls on the coast now than I have ever seen.

Gannet.—Dec. 18. A solan goose found dead on the beach. It may be worth recording that some years ago the gardener here found a young bird of this species alive in the park after a storm;

the bird had not been shot, but had either struck itself or been struck on the head with some blunt instrument. About the same time a coast-guard gave me an adult of this species which he found dead on the beach: it was choked by a gurnard; the spines of the fish were so fast in the gullet that they broke off when it was pulled out.

Little Auk, &c.—Dec. 20. Found a little auk dead on the beach in good condition: it had not been shot. I also obtained an Iceland gull, an adult male: on one of the watchers seeing it, he said that he had shot a bird, the day before, exactly the same, but much larger—no doubt a glaucous gull; he had given it to a friend who he said had “bothered him a long time for a gull”—most likely to deck some lady’s bonnet. Many of our best sea-birds meet a like fate, and are never heard of, making the species appear more rare than they really are. Very few of the shore-shooters on this coast know, or care to know, one gull from another: they will sit for hours, generally on their heels, behind rocks, with blunderbusses charged one-fourth the length of the barrel, and often shoot a good many. They tell me that they pluck, or more commonly clip, the feathers off to make pillows, &c.; and some of them declare that the flesh of gulls is “varry gud ta eat.”

Great Blackbacked Gull.—Jan. 3. I got three great black-backed gulls, one adult and two immature.

JOHN SCLATER.

Castle Eden, Durham, January 18, 1873.

Ornithological Notes from Devon and Cornwall.

By JOHN GATCOMBE, Esq.

DECEMBER, 1872.

Northern Diver, Blackbacked Gulls and Shag.—December 1. Northern divers and a large number of gulls, including both greater and lesser blackbacked, in the harbour. The shag or green cormorant has been, and is now, exceedingly numerous, owing to the long-continued gales, diving in the surf among the rocks, pursuing and searching for its prey even under the sea-weed with which they are covered; indeed it seems quite wonderful how it can do so without injury. Not long since I saw a shag actually dashed on a rock, over which it scrambled on its side and belly in

a most extraordinary manner, half swimming and half walking; after which it immediately dived, coming up again not in the least discomposed with a small rock fish in its bill.

Forktailed Petrel, Purple Sandpiper and Black Redstart.—

Dec. 2. A forktailed petrel was caught off the port. Observed three purple sandpipers on the rocks under the Hoe: they were as usual very tame, allowing an approach to within a few yards. I have seen these birds crouch to allow the spray of a large wave to dash over the rock on which they were feeding; then, rising on their legs the moment it had subsided, would pick up their food with the utmost activity, crouching again on the approach of another. Saw a black redstart near the same place. An unusual number of great black-backed gulls, shags and kittiwakes have been brought to the birdstuffer's lately, and one mew, with its stomach full of earth-worms. It is a pity the starving kittiwakes do not resort more to the fields.

Storm Petrel, Black Redstart.—Dec. 3. A storm petrel was observed flying, swallow-like, over some inundated meadows at Laira, near Plymouth, and on the same day I saw another black redstart near the Devil's Point, at Stonehouse.

Dec. 4. At Laira, in a small patch of mud just uncovered by the tide, I observed the following species:—two herons, a large flock of dunlins and ringed dotterel, one kingfisher, and a flock of about a hundred blackheaded gulls; also, on a small rock surrounded by water in the harbour, fifteen large gulls, two crows and a cormorant huddled together in the most friendly manner.

Dec. 9. The day after a tremendous gale I observed above three hundred gulls on the West Mud, with a sprinkling of shags among them, and some northern divers off the Hoe.

Raven, &c.—Dec. 10. Took a ramble on the coast beyond Bovisand, and observed several northern divers, shags, cormorants, and a host of blackheaded gulls, the latter swimming in the surf close to the shore picking up flies or some other food among the decayed drift-wood, in the manner of a phalarope. Although the blackheaded gull breeds inland, and generally frequents our rivers and estuaries, yet it appears quite at home on the sea, at times, in the roughest weather. On some rocks called the "Reannies," a few hundred yards from the shore, were resting peaceably a great many large blackheaded gulls and cormorants, and on the cliffs not far from me was a pair of fine ravens: presently, "croak,

croak, croak," off flew the male raven towards the Reannies, and immediately up got all the gulls with an immense cloud of dunlins and ringed dotterel, hovering and wheeling round, apparently in great consternation, but the cormorants did not move. For a moment I wondered what had caused all this commotion, when I espied the old raven perched on the highest pinnacle of the rocks, croaking "like mad," the cormorants still sitting quietly, but the gulls and dunlins did not venture to again alight until his ravenship had left for the shore. I have on several occasions found the remains of dead, and sometimes wounded birds on these rocks, which would fully account for the visits of the raven.

Northern Diver.—Dec. 11. Three northern divers off the Hoe, one of which caught a large fish, with which it dived frequently, keeping down for nearly a minute at a time, but at length came up without the fish in its bill, having swallowed it under water; this I have seen shags often do. A man was carrying a live northern diver about the streets of Plymouth a few days ago; and the stomach of one I examined contained nothing but crabs and some good-sized stones. I have seen the shags catch crabs also. Northern divers rarely rise from the water when pursued in a boat, but a few days since I saw one get up and fly away on the approach of a steamer, and I have often seen them very high in the air when going to or coming in from sea. Redthroated divers, on the contrary, frequently make use of their wings when chased.

Dec. 18. Notwithstanding the severe gales the weather is exceedingly mild, and this morning I caught the great tortoiseshell butterfly on the coast. This seems more strange as the species is rare in Devonshire at any season.

Wigeon.—Dec. 19. Early this morning a great flight of wigeon was seen at Laira, and at night I heard large flights whistling overhead on their way to the rivers.

Redthroated Diver, Gannet, &c.—Dec. 22. Examined six kittiwakes, a great blackbacked gull, and a redthroated diver, which had been killed in the Sound. Many gannets were seen outside the breakwater, and one was brought in by some fishermen.

Cornish Chough, Kestrel.—Went to Whitsand Bay, on the Cornish coast; weather exceedingly fine and mild. Birds singing as in spring; observed several kestrels and two Cornish choughs, which latter are very uncommon so near Plymouth.

JANUARY, 1873.

Glaucous Gull, &c.—Jan. 1. A hundred gulls, great black-backed and herring, with rooks or crows among them, on the West Mud; the contrast of the black and white plumages looked very pretty. Examined an adult glaucous gull which had been killed in the Sound: its stomach contained a large lump of fat, which had no doubt been thrown overboard from some ship; there were also a few feathers in it. Although the young of both the Iceland and glaucous gulls, of which I have myself killed a few, are occasionally met with on our coasts during the autumn and winter, yet this is the first adult glaucous gull I ever saw in the flesh.

Jan. 2. Went to Falmouth, where I saw Dr. Bullmore's collection of British birds, in which were Bartram's sandpiper and Bonaparte's gull, local specimens, besides other good things. Dr. Bullmore had recently obtained a specimen of the blacktailed godwit, very uncommon in Devon and Cornwall.

Jan. 3. Saw another glaucous gull flying up the harbour, also some northern divers off the Devil's Point, Stonehouse. Great blackbacked gulls very plentiful; lots brought to the birdstuffer's, I am sorry to say.

Puffin.—Jan. 4. Examined a very fine puffin, which had been killed the day before. Its bill was not small, as is generally the case with young birds found in winter, but, on the contrary, rather large, well coloured, and furrowed, though without the conspicuous ridge at the base of the upper mandible, and wanting the puckered skin round the mouth and warty excrescence under the eyelid. The specimen, however, was about the largest I ever saw.

Jan. 7. Again saw the old glaucous gull in the harbour. This species, I remarked, seems to be in the habit of often settling on the water for a short time.

Jan. 8. Examined a fine old northern diver, which had much of the summer plumage remaining, the wings being almost as beautifully spotted as in the breeding-season; many spots also on the back, and strong traces of the dark bands on the neck. In its gullet was a very large specimen of the greater pipe fish, above sixteen inches in length. The same day saw the old glaucous gull again, and shot an immature one.

Phalarope.—Jan. 8. Observed a gray phalarope swimming among some drift-weed just outside the surf, in the lee of a

kittiwake. Phalaropes are rarely seen on our coasts after October; indeed only two instances have come under my own particular notice within the past thirty years.

Jan. 11. Saw another immature glaucous gull and an abundance of shags and kittiwakes. One of the shags caught a large "father-lasher" or "bullhead," which in passing down the bird's gullet seemed to twist round, forming a large lump at the back of its neck. These long-continued gales have reduced the poor kittiwakes to a miserable condition: our harbours are full of them; many are daily knocked down with oars, sticks, or stones, when settling in the water near, or flying over, the quays; some have been picked up dead or exhausted even in the streets, and I am sorry to add that hundreds have been wantonly shot. It seems strange that kittiwakes should so soon succumb to weather that hardly appears to have any effect on other gulls.

Razorbills, &c.—Jan. 14. Saw an adult glaucous gull again. On the 15th the weather was particularly calm and mild. Thrushes, blackbirds, robins and other species singing beautifully at Mount Edgumbe. Saw a small party of razorbills, which I was very glad of, not having observed any since the sad mortality among them last year. At this season there are generally large flocks to be met with in the Sound and outside the breakwater, consisting almost entirely of old birds, with well-developed bills.

Jan. 18. Observed two glaucous gulls flying in the harbour, and on the 27th heard missel thrushes singing.

Black Guillemot and Blackthroated Diver.—Jan. 28. Examined a nice specimen of the black guillemot in its pretty marbled winter plumage, also a blackthroated diver, both of which were killed at Falmouth on the previous day. In the stomach of the guillemot I found the remains of fish, and some fine sea-sand, but the stomach of the diver contained nothing but sand and a few small stones. The black guillemot is but rarely seen on the coast of Devon and Cornwall. Within the last two months I have found titmice and greenfinches very plentiful in our gardens.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth.

Enormous Fossil Ungulate.—On Monday last, in the first of his Hunterian lectures for this year, Prof. Flower drew special attention to the

peculiarities of a new animal discovered by Prof. Marsh, of Yale College, and named by him *Dinocerus mirabilis*. This remarkable ungulate, nearly the size of the elephant, was obtained from the Eocene beds of the Rocky Mountain region. It possessed osseous cores for three pairs of horns, which rise successively one above the other; a supra-occipital crest is greatly developed, projecting obliquely backward beyond the condyles. The posterior pair of horns arise from this crest, the medium from the maxillaries, and the anterior from the tips of the nasals. The canines are greatly developed, and the upper incisors are wanting. The skull is unusually long and narrow, and carries six small molar and premolar teeth. The extremities resembled very nearly those in the proboscidea, but were proportionately shorter. The femur possessed no third trochanter and no pit for the ligamentum teres. It therefore possesses characters allying it with the perissodactyles as well as the proboscidea.—‘*Nature*,’ February 2, 1873.

Sea-Lion at Dinner.—“There was an enormous sea-lion alongside the ship just now; he was busily engaged fishing, and I saw him catch five big fish, eight or ten pounds weight, in less than half an hour. When he catches a fish he comes to the surface and beats it backwards and forwards violently on the water, until he seems to break it in two. During this performance gulls innumerable fly about the beast, picking up the stray morsels, and when he has finished he thrusts his huge head out of water and allows the gulls to peck at his mouth and tusks; in fact they seem to clean his teeth for him. He then swims quietly about for five minutes or so, rolls over on his side and goes down headlong, and in a few minutes appears with another fish, when the same manoeuvres are gone through.”—*G. F. Mathew*; *H. M. S. ‘Repulse,’ off Valparaiso, January 1, 1873 (in litt).*

Stoat in Winter.—Do stoats *all* become more or less white during the winter, and what is the supposed cause of the change? Severe cold appears to be the cause of the alpine hare, &c., becoming white in Arctic regions; but is the “cause and effect” so apparent in our odoriferous friend the stoat? I am led to make these remarks from what little I have seen, as the white, or rather partly white, specimens are not particularly rare some winters in this locality. It will be remembered that last winter was far from severe, and yet I had more specimens (some six or seven) sent me than I had ever seen before. Most of them were in various stages of change, some being much whiter than others; but one specimen in particular was entirely white, except a brown spot, about the size of a pea, over each eye, and the black tip to the tail, which latter mark of course is common to all. All the specimens I ever had were obtained during the months of December and January, but some winters, when the cold has been very severe, I have not seen the so-called “ermine” at all. I never saw any but the entire brown variety in the summer. I have not seen a

specimen with any white about it this winter.—*G. Bentley Corbin; Ringwood.*

Cream-coloured Mole.—One was sent me lately, making the ninth or tenth specimen I have seen during my short experience in taxidermy.—*Id.*

Heavy Hares in North Lancashire.—Occasionally very heavy hares are killed in North Lancashire. In 1861 we shot one weighing thirteen pounds, and I was told of one being killed at Rufford, in 1871 or 1872 (I forget which), weighing twelve pounds two ounces.—*Hugh P. Hornby; 9, Norfolk Street, Strand, W.C.*

Second Supplementary Report on the Extinct Birds of the Mascarene Islands.*—The small portion of the grant so liberally voted by the Association at the Birmingham Meeting in 1865, to aid my brother, Mr. Edward Newton, in his researches into the extinct birds of the Mascarene Islands, which remained unexpended at the time of my last reporting his progress, has during the last year or so been employed by him in a renewed examination of the caves in the island of Rodriguez, which had already produced so much of interest. This examination has been conducted, as before, by Mr. George Jenner, lately the chief executive officer of the island; and though I am not in a position to give anything like a detailed account of the results, I am happy to say that I believe they will be found in time to be fully as instructive as those of the former examination have been. We are now in possession of several parts of the skeleton of *Pezophaps* which have hitherto been wanting, and of more perfect specimens of some of those bones which we before obtained. We have also additional remains of the large *Psittacine* bird, described from a single fragmentary maxilla by Prof. Alphonse Milne-Edwards as *Psittacus(?) rodericanus*, and these, I hope, will enable that accomplished palæontologist to determine more particularly the affinities of the species, which have hitherto been doubtful; and I may add that thus some further light may be thrown upon the position of the *P. mauritanus* of Prof. Owen. In the course of last year my brother had the pleasure of receiving from Mr. Jenner proof of the continued existence of one of the species described by Leguat as inhabiting Rodriguez, but thought to have become extinct. This proof consisted of a specimen preserved in spirit of an undescribed and very distinct *Palæornis*, which I have since described ('*Ibis*,' 1872, p. 33) as *P. exsul*. Among the bones sent by Mr. Jenner are, I believe, some which belonged to this bird. But more remarkable and interesting still are some remains which are obviously those of a *Ralline* bird, unquestionably allied to *Ocydromus*, and

* From the 'Report of the British Association for the Advancement of Science' for 1872. Communicated by the author.

these M. Alphonse Milne-Edwards informs me he is inclined to refer to the "Gelinotte" mentioned by Leguat, the nature of which has hitherto been only open to guess. There are also bones of other species of birds, perhaps only inferior to this in interest. Most of these specimens have been entrusted to the care of M. Alphonse Milne-Edwards, for my brother and I believe that the distinguished author of 'Oiseaux Fossiles de la France' has established a claim upon the assistance of all who are interested in extinct Ornithology by that admirable work of his; and I learn from him that he will shortly make public the results of these recent discoveries.—*Alfred Newton.*

Arctic Auguries.*—During the discussion which followed the reading of a paper on the Renewal of Arctic Exploration, at the last meeting of the British Association for the Advancement of Science, Mr. Francis Galton, F.R.S., the President of the Geographical Section, in which the paper was read, did me the honour of asking me to state to the audience what zoological discoveries might be reasonably expected to be made in the regions hitherto unvisited by Arctic expeditions. To this request I had to reply that I felt my inability then to deal with a subject so extensive, though I was prepared to believe that in no part of the world would investigations, conducted by competent zoologists, meet with a richer reward than in the seas or lands situated beyond the limits as yet reached by the hardy adventurers in this direction. However, not to disappoint a large and deeply-interested assembly, I hazarded some remarks which, if they did not exactly answer the demand of the President, seemed to me to suggest reasons for further circumpolar exploration; and as these remarks have not to my knowledge appeared in print, I venture to reproduce them here, in the hope of their being found interesting to some of the readers of this journal. Instead of forecasting the nature of zoological discoveries which might or might not be made by those whose good fortune may lead them to unexplored regions, why should we not see what light is thrown upon those regions by the zoological knowledge we possess? The shores of the British Islands, and of many other countries in the northern hemisphere, are annually, for a longer or shorter period, frequented by a countless multitude of our fellow-creatures, who, there is every reason to believe, resort in summer to very high northern latitudes, for purposes the most important, and, since they continue the practice year after year, one may confidently suppose they find the migration conducive to their advantage. If this supposition be correct, it may not be out of place to consider what attracts these creatures to regions so remote. First of all, there must be some water which is not always frozen; secondly, there must be some land on which they may set their feet; and thirdly, there must be

* From the February number of 'Ocean Highways.' Communicated by the author.

plenty of food, supplied either by the water or by the land, or by both, for their nourishment and that of their progeny. Now the creatures I mean are many kinds of birds, and it may be worth while to give a short account and to sketch the movements of one of them called the knot—the *Tringa Canutus* of ornithologists. This bird is something half way between a snipe and a plover. Examples of it are commonly to be seen in the cage at the southern end of the Fish-House in the Zoological Gardens, and may be seen there at the present time. Like many other kinds of birds belonging to the same group, the colour of its plumage varies most wonderfully according to the season of the year. In summer it is of a bright brick-red; in winter it is of a sober ashy gray. Kept in confinement it seldom assumes its most brilliant tints, but some approach to them is generally made. Now the knot comes to this country in vast flocks in spring, and, after remaining on our coasts for about a fortnight, can be traced proceeding gradually northwards till it takes its departure. People who have been in Iceland and Greenland have duly noted its appearance in those countries; but in neither of them is it known to tarry longer than with us—the summer it would there have to endure is not to its liking; and as we know that it takes no other direction, it must move further north. We then lose sight of it for some weeks. The older naturalists used to imagine it had been found breeding in all manner of countries, but the naturalists of the present day agree in believing that we know nothing of its nidification. Towards the end of summer, back it comes to us in still larger flocks than before, and both old birds and young haunt our coasts till November; if the season be a very open one, some may stay later; but our winter as a rule is too much for it, and away it goes southwards, and very far southwards too, till the following spring. What I have said of the knot in the United Kingdom is equally true of it on the eastern shores of the United States. There it appears in the same abundance and at the same seasons as with us, and its movements seem to be regulated by the same causes. Hence, I think, we may fairly infer that the lands visited by the knot in the middle of summer are less sterile than Iceland or Greenland, or it would hardly pass over those countries, which are known to be the breeding-places of swarms of water-birds, to resort to regions worse off as regards supply of food. But the supply of food must depend chiefly on the climate. Is there, then, beyond the northern tracts already explored a region which enjoys in summer a climate more genial than they possess? The evidence furnished by the knot would seem to answer this question in the affirmative, and it would be easy to summon more instances from the same group of birds, tending to show that beyond a zone where a rigorous summer reigns there may be a region endued with a comparatively favourable climate. If so, surely the conditions which produce such a climate are worth investigating. The scientific man has the comfort of knowing that these conditions will be dis-

covered before long by the voyagers of some nation or the other; but an Englishman may be pardoned for thinking that his own countrymen, from their experience of the Arctic Regions, might achieve the task with less risk than other people, and that to his own countrymen should belong the glory of the achievement.—*Alfred Newton.*

New Fossil Birds with Teeth in both Jaws.—Prof. Marsh has drawn attention to a new sub-class of fossil birds from the cretaceous shales of Kansas. The specimens, while possessing the scapular arch, wing, and leg-bones of the truly ornithic type, present the very aberrant conditions of having biconcave vertebræ and well-developed teeth in both jaws. These teeth are quite numerous and implanted in distinct sockets; the twenty in each ramus of the lower jaw are inclined backwards and resemble one another. The maxillary teeth are equally numerous and like those in the mandible. The sternum has a carina and elongated articulations for the coracoids. The lower of the posterior extremities resemble those of swimming birds. The last sacral vertebra is large, so it may have carried a tail. Professor Marsh proposes the name *Odontornithes* for the name of the new sub-class, and *Ichthyornithes* for the order to contain this remarkable species, which is about the size of a pigeon.—‘*Nature*,’ Feb. 20, 1873.

Notes from North Lancashire.—More snipes appeared at St. Michael’s-on-Wyre, North Lancashire, this last season than have been known for many years on the Sowerby meadows; they arrived literally in hundreds as early as the third week in July (but very few remaining to breed of late years in the neighbourhood). When the water was so high as to drive them off the meadows, they were always to be found in some damp turnip and potato fields about a mile and a half from Sowerby. Except a few stragglers, they took their departure about the end of October. During their stay, however, we shot about two hundred and sixty, nearly every one of which we carefully weighed: four ounces was the average weight, a few turning the scale at four ounces and a quarter, and others being somewhat under the four ounces. The four heaviest were—one on September 26th, four ounces and three-quarters; October 12th, four ounces and a half; and two on October 25th, respectively weighing four ounces and three-quarters and five ounces. The first jack snipe was seen on September 21st. The first woodcock was killed on October 20th, and weighed sixteen ounces; two more were killed in December weighing eleven ounces each. Three specimens of the spotted crane (*Crex porzana*) were killed on the Sowerby meadows, and others were seen, but we did not molest them, hoping they might remain to breed. The first was killed on September 17th, the last seen about December 9th. One of those killed weighed four ounces and three-quarters, another barely four ounces, and the third was not weighed. Landrails, which were till 1871 very abundant about us, have since then been very scarce, and we have therefore spared every one we have seen.

We saw one later than usual this last season, *viz.* on October 19th. Sand martins last seen to my knowledge on September 26th; house martins, October 3rd; and swallows on October 16th. Quails are not so numerous as five or six years ago, but a few remain every year to breed with us. In 1865 we shot twenty; in 1866, nineteen; in 1867, eight; in 1868, six; in 1869, one; in 1870, nine; in 1871, one; and this last season, two. As they sit very close we probably pass by a good many.—*Hugh P. Hornby.*

Early Nesting of Birds.—This exceedingly mild weather has had a marked effect upon the amatory propensities and consequent early nest-building of several birds. On the 3rd of the present January I saw a thrush's egg, and heard the song of both this bird and the missel thrush on several mornings. I am also informed, on reliable authority, that a robin's nest containing three eggs was found on New Year's Day.—*G. B. Corbin.*

A Happy Family.—April 1. On a tree in front of the house a pair of kestrels have taken an old crow's nest, so that we have a good chance of watching them. The male is very noisy. There is a carrion crow's nest just behind the house, so we have an aviary without trouble. May 12. My aviary flourishes; the crows are hatched, and the kestrels will not be long. A pair of wood pigeons have built a nest within six feet of the hawks, on the same level, and not a branch to divide them, so that the ladies can watch each other, and relate their experiences, provided they have the same language. June 5. The crows are flyers; the kestrels are a fortnight or more old. I think there are some young pigeons, but the tree is so thin I am afraid to send a boy up to make sure, and the young moorhens are real black beauties.—*From letters of the late Thomas Dix, dated Chwynbedw, North Pembrokeshire, 1871.*

Bohemian Waxwing at Bishop's Lydeard.—I saw a Bohemian waxwing on my lawn this morning.—*Murray A. Mathew; Bishop's Lydeard, Taunton, February 7. 1873.*

Bohemian Waxwings near Pickering.—On Wednesday morning a flock of ten of these beautiful birds, the Bohemian waxwing or chatterer, was observed near Pickering. Eight of them were shot by G. C. Hawson, and are now in his possession.—*'Leeds Mercury,' Feb. 9, 1873.*

The Common Wood Pigeon and Stock Dove.—At this season of the year these two species of wild dove may be found mixed together in their feeding grounds, but their food is different, and may be worth noticing as a useful fact for agriculturists and interesting to naturalists. My nephew, who is at present residing in Pembrokeshire, tells me that he fired into a flock in a clover-field after barley; the result was two wood pigeons and three stock doves. At a distance they are scarcely distinguishable, although very dissimilar in size. The crops of the wood pigeon, or ring dove, contained ivy berries, a quantity of little brittle stick-like roots, which blister the tongue, and a great pulp of clover-leaves, turnip-tops and bulbs. Those of

the stock dove contained not a leaf of clover, but an egg-full of charlock seeds, some barley, and several weed seeds.—*Edward Hearle Rodd; Penzance, February 14, 1873.*

Distinctive Marks of the Redlegged and Barbary Partridges.—The chief distinction between the Barbary and the redlegged partridges is of course in the feathers of the neck. There is, however, another difference, which I have not seen mentioned, and which seems to me quite as marked. It is in the feathers about the flanks. The markings of these feathers in the two birds are quite different; the Barbary partridge being richer and having two bars of black, instead of one, as in the redlegged. The colours of the feathers are as follows, beginning from the top:—

REDLEGGED.

Bar of reddish brown.
Bar of black.
Bar of yellowish white.
Grey about the shaft, reddish about the edge.
Reddish light brown
Grey fluff tipped with light brown.

BARBARY.

Bar of reddish brown.
Bar of black.
Bar of white.
Bar of paler reddish brown.
Bar of black.
Gray, very slightly bordered with reddish brown.
Light brown.
Gray fluff, tipped with brown in parts.

The way the bars go in the two feathers is different. In the redlegged they slant; in the Barbary they are nearly semicircular, with the exception of the bar of black nearest the gray, which goes straight till it reaches the shaft; on the other side of the shaft it begins again, either higher up or lower down, but not quite even, then gets narrower as it nears the edge.—*C. B. Carey.*

Lizard-eating Pheasant.—During last summer a hen pheasant having been found dead, and being in very fine plumage, it was given me to stuff. Having skinned it, and finding no marks which seemed to be the cause of death, I proceeded to dissect it, as I often do after skinning a bird. In the crop I found a few barley-corns, and some other seed-like bodies, whilst in the stomach was a full-grown lizard, which had been swallowed whole, and had not even cast its tail. I need scarcely say that the lizard was dead when I found it, and that its discovery in such a situation somewhat surprised me. Could the swallowing of it have occasioned the death of the pheasant, or do these birds occasionally make a meal of the agile little reptile in question during the summer months? I never observed them do so, and I never before dissected a specimen except at the time when the lizards are hibernating. Perhaps some of my more experienced brethren

can throw more light on the subject than I, in my limited sphere of observation, am able to do. I may state that the reptile was the common sand lizard (*Lacerta agilis*). Had I found it in the stomach of such a bird as the kestrel it would not have surprised me, for in that case the occurrence would seem to accord more with the habits of the bird.—*G. B. Corbin*.

Gray Phalarope in Winter Plumage.—I have just received and mounted a gray phalarope, shot a couple of days since on Braunton Burrows, in North Devon. It is in perfect winter plumage, and differs from all other gray phalaropes I had before examined in the flesh, in being in excellent condition, the body being well lined with fat.—*Murray A. Mathew; Bishop's Lydeard, January 28, 1873.*

Heronries in Ulster.—Allow me to make a few additions from this neighbourhood to Mr. Harting's list of British heronries. These are, in County Donegal, one at Kilderry (Mr. G. V. Hart), of upwards of twenty nests in Scotch firs, and about half-a-dozen in beech trees. This is the one referred to by Mr. Harting (Zool. S. S. 3407). Formerly there used to be many more nests, built principally in Scotch fir trees; it is only of late that they have begun to build in the beeches. One at Glen-Gollan (Mr. T. Norman), and one at Dunmore (Mr. R. M'Clintock). This gentleman writes to me as follows:—"With regard to the herons, there were only nine nests here last spring. All were built in beech trees except one, which was built in a silver fir. They used to build very much in Scotch firs, but now seem to prefer the beech. In old times we used to see forty or fifty of them in the pairing season sitting on the lawn. The invention of 'arms of precision' has played the mischief with them." In County Londonderry there is one at Willsborough (Captain Scott). Even with these additions, I think it by no means improbable that the list of heronries in Ulster still remains incomplete.—*W. E. Hart; Kilderry, Co. Donegal.*

Heronries: Errata.—As a Welshman, there are a few words in the 'Zoologist' for the current month that offend my ears, and I cannot help calling your attention to them. At p. 3407 there is mention of a heronry at "Vorlas Hall, belonging to Mrs. Wynn Finch." Now, setting aside the fact that Mr. Wynne Finch is alive, and I believe in good health, the name of the place is Voelas, the really correct spelling ("Foelas") being now considered pedantic. Two lines lower down on the same page, "Rug" should be spelt "Rhug." Pardon my impertinence for calling your attention to the errors above mentioned: a Welshman is always jealous for his native language. You will see that Wynne Finch has an "e", which is wanting in the name of the Hon. Charles Wynn. Your correspondent has spelled both alike.—*W. H. Heaton; Meadow Croft, Reigate; Feb. 18, 1872.*

Guillemot moulting its Quill-feathers.—Mr. Gatcombe seems to be quite right in his supposition that the guillemot moults so many of its wing-feathers at the autumnal moult as to be unable to fly (Zool. S. S. 3392).

In September, 1871, Mr. Gurney, jun., and myself had a chase after one which was in the same predicament: the quills were just beginning to show themselves. Mr. Gurney mentioned this in the 'Zoologist' for 1871 (S. S. 2845). This moulting of the quill-feathers is not peculiar to the guillemot alone, for I have found common scoters off Dawlish, in October and November, quite unable to fly: this was the more extraordinary as it was their first appearance on the coast for that year, and they must have made the whole or part of their migratory journey by swimming, as they would have had but little or no use of their wings.—*Cecil Smith; Lydeard House, near Taunton.*

Iceland Gull at Mount's Bay.—Our smaller white-winged gull may be regarded as a rare visitor generally on our coasts in Cornwall, but during the last month a considerable number have come to us. I have not seen them myself, but Mr. Vingoe is my informant, whose son has noted their appearance in large numbers, especially in a cove named in the maps "Lamorna Cove," about three miles from Penzance. All the birds appeared to be clouded in their plumage, denoting immaturity.—*Edward H. Rodd; February 18, 1873.*

Leach's Petrel and Black Tern near Newbury.—On the 27th December I saw a specimen of Leach's petrel that was shot by a gentleman in the neighbourhood some time since. I have a very nice specimen of the black tern in my collection, which was killed by a friend of mine in this neighbourhood.—*William H. Herbert; Newbury.*

Ray's Wagtail in Hertfordshire in the Winter.—As an instance of the mildness of the season, I may mention that I yesterday noticed a pair of Ray's wagtails (*Motacilla Rayi*) feeding at the edge of a water-cress bed between Cassiobury Park and Rickmansworth.—*C. Bygrave Wharton; Bushey, Herts, January 16, 1873.*

Proceedings of the Entomological Society.

January 6, 1873.—Prof. WESTWOOD, M.A., F.L.S., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—Stal, 'Monographie des Chrysomélides de l'Amerique,' 3 pts.; 'Homoptera nova vel minus cognita'; 'Bidrag till Reduviidernas Kännedom'; 'Bidrag till Hemipternnas Systematik'; 'Synopsis Saldarum Sueciæ'; 'Hemiptera Fabriciana,' 2 pts.; 'Bidrag till Membracidernas Kännedom'; 'Hemiptera insularum Philippinarum'; 'Bidrag till Philippinska öarnes Hemipter-fauna'; 'Enumeratio Hemipterorum,' i. & ii.; 'Orthoptera quædam africana.'—Wallengren, 'Heterocer-fjärilar, samlade i Kafferlandet

af J. A. Wahlberg'; 'Nordöstra Skanes Fauna'; 'Anteckningar i Entomologi'; 'Skandinavien Neuroptera,' i.—Fahræus, 'Coleoptera Caffrariæ, annis 1838—1845 a J. A. Wahlberg collecta, Heteromera.—Boheman, 'Spetsbergens Insekt-fauna'; 'Bidrag till Gottlands Insekt-fauna.'—Kindberg, 'Anteckningar om Östergötlands Dagfjärilar.'—Neuman, 'Vestergötlands Hydrachnider.'—Stuxberg, 'Bidrag till Skandinavien Myriopodologi; i. Sveriges Chilognather.'—Porath, 'Redogörelse för en under sommaren 1868 utförd zoologisk resa till Skane och Blekinge'; 'Om nagra Myriopoder från Azorerna.'—Thomson, 'Entomologiska anteckningar under en resa i Skane 1866.'—Thorell, 'Om Aranea lobata, Pallas (A. sericea, Oliv.);' 'Araneæ nonnullæ Novæ Hollandiæ descriptæ.'—Reuter, 'Öfversigt af Sveriges Berytida.'—Malm, 'Om två för vetenskapen nya Amphipod-species från Bohuslän, af hvilka det ena är typ för ett nytt genus inom Pontoporeirernas grupp.'—Holmgren, 'Bidrag till Kännedomen om Beeren Eilands och Spetsbergens Insekt-fauna.'—Presented by the Royal Swedish Academy of Sciences. 'Coleopterologische Hefte,' ix. & x.; by the Baron E. v. Harold. 'Recherches physico-chimiques sur les Articulés aquatiques,' 2e partie; by the Author, M. F. Plateau. 'Histoire Naturelle des Punaises de France,' par MM. Mulsant & Rey,—Scutellerides, Pentatomides; by Francis Walker, Esq. 'Exotic Butterflies,' part 85; by W. W. Saunders, Esq. 'Lepidoptera Exotica,' part 15; by E. W. Janson, Esq. 'Proceedings of the Royal Society,' no. 139; by the Society. 'Mélanges Orthoptérologiques,' fasc. iv. Mantides & Blattides; by the Author, M. H. de Saussure. 'The Zoologist' for January; by the Editor. 'Newman's Entomologist' for January; by the Editor. 'The Entomologist's Monthly Magazine' for January; by the Editors. 'On a new Family and Genus and two new Species of Thelyphonidea'; by the Author, the Rev. O. P. Cambridge, M.A., C.M.Z.S.

Election of Members.

The following gentlemen were balloted for, and elected, viz.—G. C. Champion, Esq. (formerly a Subscriber), as Member; and B. G. Cole, Esq., as Subscriber.

Exhibitions, &c.

Mr. M'Lachlan exhibited (on behalf of Mr. George Lewis), a magnificent collection of coloured drawings of the metamorphoses of twenty-one species of Japanese Sphingidæ. These drawings had been executed, under the direction of Mr. Lewis, by a native artist, and were remarkable for the full details shown of the various states; in some cases three different varieties of the same larva were figured. Mr. Lewis requested it to be announced that he was willing to present the drawings to any Member of the Society who would undertake to publish them.

Prof. Westwood exhibited the beautiful net-work cocoon of a species of small moth from New Granada. This was attached to, or suspended from, a leaf on which was also a species of Hesperiidæ strongly affected by fungoid growths.

Mr. E. Saunders exhibited two species of Buprestidæ, from the Pelew and Caroline Islands respectively, which appeared to pertain to a new genus, notwithstanding that they bore much external resemblance to two species of Chrysodema from the East India Islands.

Mr. Champion exhibited *Nanophyes gracilis* and *Apion sanguineum*, two species of Coleoptera rare, or recently detected, in Britain.

Mr. Müller called attention to a recently-issued Government Report, intituled "Papers respecting the *Phylloxera vastatrix*, or new vine-scurge," detailing an account of the ravages of this insect in various continental districts, and the means that had, with more or less success, been adopted for preventing its spread. Prof. Westwood stated that the occurrence of the insect in England had been noticed by him in 1862, in a paper read before the Ashmolean Society.

Papers read, &c.

Dr. Sharp communicated a list of the water-beetles of Japan, chiefly drawn up from materials collected by Mr. George Lewis, with remarks on the distribution of the said insects.

Mr. Wollaston communicated two papers. First, on a new genus (*Pseudotarphius*) of Colydiidæ from Japan; and secondly, on the Cossonidæ of the same islands. In the latter paper the author commented upon the apparent absence of European types in the districts of Japan visited by Mr. Lewis, and stated that their place seemed to be taken by representative forms. Mr. Pascoe thought the fauna of Japan might be indicated as "satellite" (like that of Madagascar, &c.), having a quantity of peculiar species mixed with others; and a great deal in common with the coasts of China and Siberia. Mr. H. W. Bates asked that judgment upon the affinities of the Japanese fauna be suspended pending further information. He said that although there were many Western European species found also in Japan, the collective faunas of the two regions were totally distinct.

New Part of 'Transactions.'

Part iv. of the 'Transactions' for 1872 (published in December, 1872) was on the table.

Annual Meeting, January 27, 1873.—Prof. WESTWOOD, M.A., F.L.S., President, in the chair.

The Treasurer's accounts for 1872 were read in abstract by Mr. Stainton, one of the Auditors, and showed a balance of £160 12s. 1d. in favour of the Society.

The Secretary read the Report of the Council for 1872.

The following gentlemen were elected Members of Council for 1873:—Messrs. H. W. Bates, Butler, Grut, M'Lachlan, Müller, S. S. Saunders, F. Smith, Stainton, Stevens, Verrall, C. O. Waterhouse, Weir and Westwood.

The following officers for 1873 were subsequently elected:—President, Prof. Westwood; Treasurer, Mr. R. M'Lachlan; Secretaries, Messrs. F. Grut and G. H. Verrall. Librarian, Mr. E. W. Janson.

The President read his Address.

Mr. Dunning proposed, and Mr. Weir seconded, a vote of thanks to the officers for the past year; this was carried unanimously, and Prof. Westwood and Mr. Stevens returned thanks.

Mr. Pascoe proposed, and Mr. Stainton seconded, a vote of thanks to Mr. Dunning for his donation of £50 to the Society's funds; this also was carried unanimously.—*R. M'L.*

February 3, 1873.—H. W. BATES, Esq., Vice-President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—‘Proceedings of the Royal Society,’ vol. xxi., no. 140; presented by the Society. ‘Bulletin de la Société Impériale des Naturalistes de Moscou,’ 1872, no. 2; by the Society. ‘Berliner Entomologische Zeitschrift,’ t. xvi., 2—4; by the Society. ‘Mémoires de la Société de Physique et d'Histoire Naturelle de Genève,’ t. xxi., 2e partie; by the Society. ‘L'Abeille,’ tome ix., livr. 1 and 2; by the Editor. ‘The Entomologist's Monthly Magazine,’ for February; by the Editors. Newman's ‘Entomologist,’ for February; by the Editor. ‘The Zoologist,’ for February; by the Editor. ‘The Canadian Entomologist,’ vol. iv., no. 12; by the Editor. ‘Notes on the Species of Saturniæ, or ocellated Silkworm Moths, in the collection of the Royal Dublin Society,’ by W. F. Kirby; by the Author. ‘Un mot sur le mode d'adhérence des mâles de Dytiscides aux femelles pendant l'acte de l'accouplement,’ par Félix Plateau; by the Author. ‘Excursions Lepidoptérologiques aux Hautes-Fanges pendant l'été de 1872,’ par MM. Ch. Donckier et L. Quaedyliog; by the Authors.

Election of Member.

William Cole, Esq., of 10, Aberdeen Terrace, the Downs, Clapton, was balloted for, and elected a Member of the Society.

Exhibitions, &c.

Mr. F. Smith brought for exhibition a box of Indian Hymenoptera collected at Nuddea, in the district of Minchindipore, about eighty miles from Calcutta. It comprised about 200 specimens of Fossores, 160 Apidæ, and 230 Formicidæ. Of the Fossores there were, apparently, only two undescribed species out of about forty, and the same with the Apidæ; but amongst the species of Formicidæ there were eight or ten which appeared to be undescribed. They were all in extremely fine condition; the most interesting species in the collection being a new Astata, and four or five beautiful species of the genus *Nomia* among the bees.

Mr. Mc'Lachlan exhibited the quadrangular case of the larva of a species of Trichopterous insect, together with the larva itself, preserved in glycerine. These had been placed in his hands by the Rev. A. E. Eaton, who found them in the Dove, a swiftly running stream in Derbyshire. He supposed it to pertain to *Brachycentrus subnubilus*, as the larvæ of that species were not known to manufacture quadrangular cases. Mr. Eaton, however, stated that he was not quite satisfied that the case and larva found by him were actually those of *Brachycentrus*, for he had never seen that genus in the part of the Dove in which he found them, though it occurred lower down the stream.

Mr. Champion exhibited specimens of a large species of *Pulex* found by Mr. F. Walker in a mouse's nest in the Isle of Sheppy.

Mr. Bird exhibited a specimen of *Cerastis erythrocephalus*, taken on the 28th of October last at Darenth Wood.

Mr. Meldola exhibited a living specimen of a myriapod of the genus *Spirobolus*, which had been sent to him from San Francisco. Also eggs of a leaf insect (*Phyllium pulchrifolium*) from Java. He also showed a specimen of a *Noctua* impaled on a thorn, supposed to have been done by a shrike. Mr. Weir was inclined to think that, in this case, the insect was so impaled; but he believed that insects were frequently impaled by other means.

Mr. Pascoe called attention to a remark made by Mr. Walker in the February part of the 'Entomologist,' to the effect that the fireflies (*Succiola Italica*), seen in abundance in Italy, had probably entered that country from the East, and were hindered by the Maritime Alps from occupying the Mediterranean coast of France. He (Mr. Pascoe) had seen the insect in abundance in France between Cannes and the Var, and was desirous of ascertaining if any entomologist had noticed it further westward in France.

Mr. Albert Müller communicated the following notes regarding the originators of the pouch-galls on cinnamon:—

"On the 4th of March, 1872, I exhibited before the Society some specimens of an open pouch-gall on the leaves of *Cinnamomum nitidum*, from Bombay; and in a note on the subject (Proc. Ent. Soc. Lond. 1872,

p. ix., and 'Zoologist,' 1872, p. 3036), I was inclined to attribute them probably to the action of a mite, belonging perhaps to the genus *Phytoptus*.

"In reference to this question, my valued correspondent, Dr. Fr. Thomas, to whom I had communicated the said note, has since expressed the opinion that it will have to be tested by further observations, whether the gall owes its origin to a mite, and that he doubts it (*Giebel's Zeitschr. f. d. ges. Naturwissensch.* 1872, p. 475).

"I am quite of the same opinion as my learned friend, that the matter requires further elucidation, but residents in the East can best solve the riddle, either by careful investigations on the spot, or by the transmission of materials to Europe.

"This seems the proper place to allude to the fact that an allied, if not identical creature, attacks the leaves of cinnamon bushes in Ceylon. John Nietner has placed on record that in the neighbourhood of Colombo, where there exist old Dutch plantations of cinnamon bushes, 6000 to 8000 acres in extent, the bushes often form a single, monstrous, tangled mass, their leaves being curled up by numerous swellings of the size of peas or beans. The acorn-shaped fruits of the same plant are often similarly affected, swelling up until they assume the size and colour of a walnut. Nietner puts the question whether these excrescences might not be the work of a *Cynips*; but as he subsequently compares them to the bulged-out leaves of some species of *Ribes*, inhabited by *Aphidæ*, we must leave his former supposition out of consideration (*Stettin Ent. Zeitung*, 1857, p. 39).

"In a letter which I have since received from Dr. Thomas, this gentleman expresses his supposition that the Bombay excrescences may be produced by one of the *Psyllodes*. If we bear in mind what Nietner says of the Singalese form, Dr. Thomas's opinion undoubtedly becomes entitled to much consideration, and may eventually turn out to be founded in fact. For my own part I prefer to suspend my judgment until fresh materials from the East shall have enabled me to examine the excrescences in question, as well as their inhabitants, more in detail."

The Rev. Mr. Eaton stated that he had had a specimen of a *Trombidium* given to him, which had been taken by Mr. Benjamin Lee Smith, in September last, at Spitzbergen.

Papers read, &c.

"On the *Hydroptilidæ*, a Family of the *Trichoptera*," by the Rev. A. E. Eaton, M.A.

"A Monographic List of the Species of *Gasteracantha* or Crab-Spiders, with descriptions of new species, &c.," by Arthur G. Butler, F.L.S., F.Z.S., &c.

Notes on the Right and Sperm Whales.

By Prof. N. S. SHALER.

[In connection with Dr. Gray's papers on the Whales and Dolphins inhabiting or visiting the seas surrounding the British Islands, the following notes by Professor N. S. Shaler, which have just appeared in the 'American Naturalist' (vol. vii. p. 1), appear to me of such great interest that I cannot hesitate to reprint them. With a few exceptions, and those written by sea captains, and not by naturalists, we seem to have no knowledge whatever of the whale as a living animal. We have plenty of descriptions and pictures of the halves of ships descending from the skies into the ocean and men tumbling out of them; and the artists have kindly informed us that these are "boats attacking whales"; yet I imagine that no thirst for sensational excitement can accept these pictures as truthful representations of events that take place. I acknowledge therefore, most willingly, that I feel myself under great obligation to Professor Shaler, who thus places us face to face with an eye-witness of scenes quite as marvellous as those fictions which astonished our childhood.—*E. Newman.*]

THE following notes on the habits of the right whale were taken down in a conversation with Captain John Pease of Edgartown, an old whaler, whose powers of observation as well as of accurate and clear statement I have rarely known equalled. As far as possible these statements have been collated with those of other experienced whalers.

All of the south latitude right whales are without calves up to July 1st; the females are found in the bays about this time. The calves all come at once, it being but two or three days between the bearing of the first and last calves. None are found with the herd up to the 1st of July, and every female has her calf by the 3rd or 4th of the month.

The right and humpback whales are very fond of their young, taking no care of themselves in their efforts to save it; the sperm whales, on the other hand, are quite without affection, as far as can be determined by their behaviour.

Sperm whales have leaders of the herd, which they follow with a certain obstinacy; these leaders seem to give the alarm to the others. No such subordination can be observed among right whales. Sperm whales, as is well known, have the males very much larger than the females, while the reverse is the case among the right whales. This is interesting in connection with the fact that the male sperm whales struggle furiously together, while the

males of the right whales seem to have no conflicts with each other. Captain Pease had seen males struggling with each other, and often found their bodies scarred with the imprints of the rival's teeth; the scars showing their origin very distinctly by their form—the distance apart of the wounds answering to the intervals of the teeth. The great superiority in the size of the males among the sperm whales is just what would be expected in a species where the males struggled in the combats of rivals. The gain in size under the influence of these conflicts of the males is generally limited in land animals within pretty narrow bounds. There are probably no land animals where the male is double the weight of the female, yet the male sperm whale would seem to excel the female by more than this proportion. This extreme development of the males occurs also among the Otariidæ as well as among many groups of fishes, so it would seem as if there was some reason why the influences tending to limit size were less active in the sea than on the land. The reason for the greater freedom to acquire size in the sea is undoubtedly to be found in the less weight of bodies in that element, the effect of which is shown as well in the structures of man as in the structures of nature; the ship exceeds all vehicles for land transportation for the same reason, and in something like the same proportion, that marine animals, when size is the advantage, exceed terrestrial forms.

The conflicts between the males of sperm whales lead to great damage to the lower jaw; the evidence goes to show that at least two per cent. are crooked more or less, and one in several hundred very badly bent by these struggles. There are two specimens in the small museum at Nantucket which are singularly contorted; one of them is bent laterally into one turn of a spiral. Captain Pease tells me that he found one that was bent sideways at right angles to the proper position and firmly fixed there, seeming to be a permanency in this singular place. In fighting, the males rush at each other with open jaws, and strike in passing. The great speed and power of these massive creatures must lead to the most serious results from these collisions. Capt. Pease found a sperm whale nearly dead on the water with the lower jaw hanging by a single band of ligament a few inches through. The creature was being devoured by sharks and crustaceans, but the wrench which had crippled this whale must have come from one of his kind.

Captain Pease has several times seen the killer attack right and humpback whales; they strike for the tongue if possible. They often jump many feet from the water and fall upon him. Many individuals, fifty or more, join in this attack. They tear out large pieces from the blubber, food being evidently the object of their attack. Their great activity makes the whale helpless against them, though he will struggle furiously before overborne. They sometimes drag down the whale after it has been killed by the whalemen.

The Captain was quite sure that the chief article of food of the sperm whale is squid, as they vomit large quantities of them in their death agonies; he thinks that the whales take them by swimming with the mouth so wide open that the lower jaw stands at nearly right angles to the upper. Squid, he thinks, will grasp at the jaw as the whale passes among them, and are cut in fragments by the sudden closure of the jaws. He says that the jaw is closed with prodigious force and suddenness, so that when out of water the noise can be heard for two or three miles, and is even noticeable under water. He stoutly maintains that he has seen fragments of squid, where the whales had cut them in two, exposing the cavity of the body, which was as large over as the head of a forty gallon cask. In one case he saw the head of a squid which he believes to have been as large as a sugar hogshead.

The Captain is convinced that the right whale has a trace of hair within the skin. He says that when the skin is fresh, if it be scraped with a knife so as to remove the superficial parts, there will then be seen a trace of hair in the inner section. This point is worthy of attention from those naturalists who have opportunities for such work. It is evident that if the whale is the descendant of some land mammal form it would be likely to preserve a trace of the hairy covering. In this connection it is interesting to note that, in the museum at Nantucket, there is a tooth of a sperm whale with two fangs after the fashion of an ordinary mammalian canine. The specimen was taken many years ago, but with it is the statement that the other teeth of the whale were of the same fashion. This clearly looks like a reversion of some higher mammalian form of dentition.

Captain Pease thinks that right whales attain very nearly their adult size in three years, there being about three distinct sizes found at one time in the sea. He thinks, however, that they may

continue to grow very slowly for some years longer, the ultimate size depending a good deal upon the haunt of the whale; some regions having larger specimens than others. If the whales are descendants of our marine Carnivora we should expect them to preserve something like the same growth rates, for this feature seems to be tolerably permanent in any group of related animals. The rate of growth, deducible from the observations of the practical students of the whale, coincides pretty closely with what we should be inclined to expect on the supposition that the Cetacea were descended from some ancestor like the marine Carnivora.

The great decline of the whale fishery in all countries seems likely to deprive us of the ill-used opportunities, which naturalists have long had, of making themselves acquainted with the habits of the greatest of the mammals. There are many questions which should be discussed and settled before the class of clear-headed and observant whalers has passed away; else we may remain for centuries without a competent knowledge of the ways of this, the greatest living monument of animal life.

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 3402.)

JANUARY AND FEBRUARY, 1873.

Blackbird.—January 9th. Blackbirds and mistletoe thrushes have been singing during the last week in December and the first week of the new year. I heard the spring notes of the starling in December.

Green Plover.—Very large flocks have wintered in the marshes and middle marsh district. I lately had an opportunity of making a careful estimate of the probable number of birds composing one of the large flocks which we now daily see winnowing to and fro above the marsh land: they happened to pass directly over me, in an unusually long and extended line; by counting up to one hundred and then taking the rest in sections I found there were about four thousand. This was only one flock out of many in the marsh. What an enormous amount of insects, insect larvæ, worms, &c., they must extract from these lands in the course of a single season.

From the mild open weather and excessive rainfall,* they have not suffered from a scarcity of food. This is, moreover, evident from their fat and plump condition.

Shorteared Owl.—I am frequently putting up these owls from rough grass, drain-banks and stubbles: to judge by their castings, which I find on the drain-sides, they prey mainly on field mice (*Mus sylvaticus*, Linn.) These mice have been most numerous during the autumn and winter, and have done much damage in some of the plantations by gnawing off the bark round the young ash plants. It is not unlikely that the large number of owls which have visited us this winter may have been attracted to some extent by so plentiful a supply of food.

Golden Plover.—February 15th. Spring note first heard.

Scaup Duck.—February 15th. A flock of scaup off the coast in this parish is composed of males and females in about equal numbers.

Snow Bunting.—February 15th. Observed some of these buntings running rapidly along the strip of sand at the foot of the embankment, picking up small fragments of chalk and sand.

Wild Ducks.—February 22nd. We have had scarcely any wild-fowl of any description on the ponds, becks and drains, the weather having been never sufficiently severe to drive them inland from sea and river. Large flocks, however, of various wild-fowl have frequented the Humber during the last six weeks: gray geese, brent geese, pochards, tufted ducks, goldeneyes and many widgeon. I am told also that immense flocks of various wild-fowl have visited the upper reaches of the river near the mouths of the Trent and Ouse.

Meadow Pipit.—February 25th. Wind east, sharp frost and driving snow. This morning during the storm I noticed many pipits running over the weeds in our main marsh drain; they were picking off some small substances from the floating leaves of the water grasses.

Brownheaded Gull.—February 26th. The brownheaded gulls have I see in several instances acquired their summer caps.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
March 3, 1873.

* The rainfall in this district in 1872 was 35.74 inches, the average of the last seven years, being 27.46 inches.—J. C.

Ornithological Notes from Devon and Cornwall.

By J. GATCOMBE, Esq.

(Continued from Zool. S. S. 3446).

FEBRUARY, 1873.

Wigeon.—February 1st. Cold east wind, with sleet and snow. Saw some wigeon on Weston Mill Lake.

Fieldfare, Longtailed Tit and Merlin.—February 4th. At Complin, near Plymouth, I observed many flocks of fieldfares and a party of longtailed tits; and examined a merlin which had been recently killed, the stomach of which contained some feathers and the legs of a sky lark and yellow bunting.

Black Redstart, Green Woodpecker, &c.—February 5th. Walked on the coast to Bovisand, where I observed a fine black redstart, some blackheaded buntings and a green woodpecker, which latter was busily searching for food along the face of the cliffs overhanging the sea, some miles from any kind of wood. I have often observed the green woodpecker on the bare coast before. On the shore I found a dead puffin and razorbill. Sky larks were in full song to-day. In a former note I gave a list of the birds I found feeding on the decaying heaps of sea-weed along the sea-coast; since then I have been enabled to add three more species, *viz.*, rook, jackdaw and black redstart. Bullfinches have been rather plentiful during the last few months. I generally meet with them in woods, hedgerows, lanes and orchards, but the other day I was rather surprised at seeing some hopping about among the grass in an open field, and not at all near the hedge.

Linnet.—February 11th. Saw many fieldfares and some small parties of wood larks, and on the mud-banks of Weston Mill Lake were congregated thousands of the common linnet feeding among some green plants (I think a kind of *Salicaria*), with which the mud-banks are covered: so numerous were they that they seemed almost to perch on each other's backs, and when they rose the rushing noise made by their wings could be heard at a long distance off. Although I got pretty close to this immense swarm, and watched them closely with a pocket telescope, yet they appeared to consist almost entirely of one species, nor could I detect a single variety among them. When watching some ringed dotterel near the same place, I was much interested in seeing one of the party draw a long worm from the mud and swallow it whole. I am

sorry to say that a very large number of linnets have been brought to our markets—no doubt killed from the immense flocks I have mentioned.

Blackheaded Gull and Razorbill.—February 13th. Examined a specimen of *Larus ridibundus*, with the black head of the breeding season nearly completed; also a razorbill, with the sides of its neck and throat strongly mottled with black. On the 16th I watched some razorbills diving off the Devil's Point, at Stonehouse, and a small flock of *Larus ridibundus*, most of which were assuming the black head.

Herring Gull, &c.—February 15th. Herring gulls crying in the air, just as in the breeding season. Came across many wood larks and sky larks in full song. Saw four or five bullfinches, and met with the remains of a wagtail and linnet which had been killed by a hawk. On the 19th, at Whitsand Bay, on the Cornish coast, were some very large flocks of herring gulls upon the rocks near their usual breeding-place, which on being disturbed made a tremendous noise in the air. Since the late gales great numbers of this species have left our harbours and retired to the coast. Flocks of blackheaded gulls, too, leave our mud-banks towards dark, on a fine evening, flying high overhead in strings, like curlews.

Kestrel, Dipper, &c.—February 18th. Went to Bickleigh Vale and Roborough Down. Examined the roosting-place of a kestrel, where I found an abundance of pellets consisting entirely of the fur, bones and a few teeth of mice. Saw some golden plover, lapwings and fieldfares. In the river Plym at Bickleigh Vale met with some waterhens and several dippers, one of which was hopping about in a shallow but rapid part of the stream with its head and neck completely under, and water rippling over its back. Gray wagtails tolerably numerous, with several marsh and other tits.

Gray Wagtail and Mountain Finch.—February 20th. Gray wagtails assuming the black throat. Saw a titlark mount singing in the air, and descend without spread wings and tail, as in the breeding time. Some mountain finches killed in the neighbourhood.

Purple Sandpiper, Knot, &c.—February 23rd. Mews very plentiful, but the last kittiwake I saw was on the 6th. Several waterhens in the market in beautiful plumage, with bills and legs very fine in colour. Watched a purple sandpiper on the rocks

near the Hoe. Several knots have been lately killed in the neighbourhood; they are unusually plentiful this season—indeed I rarely see any after the autumn.

Glaucous Gull, &c.—February 25th. Observed an immature glaucous gull and another purple sandpiper; also examined a blackthroated diver lately killed.

Lesser Blackbacked Gull, &c.—February 26th. Chaffinches in full song. Lesser blackbacked gulls seem to have taken the place of the greater, which have left since the abatement of the late gales.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth.

Erratum.—Zool. S. S. 3443, two lines from bottom, *for* blackheaded *read* black-backed.

The Theory of Dr. Baldamus as regards the Cuckoo's Egg.

By W. C. HEWITSON, Esq.

I CANNOT read Mr. Smith's paper, and I do not believe that any one else who took part in the former controversy with regard to the eggs of the cuckoo can read it, without coming to the conclusion that it is a personal attack upon myself, and as such I accept it. I am at least one of the "would-be" ornithologists mentioned by him, and if an intense love of the glorious works of the Creator, and birds amongst the rest, makes an ornithologist, I was one probably before he was hatched: further that my love of truth, which he seems to think he monopolises, is as strong as my love of Nature, and it was the impulse of both of these feelings which led me to attack a theory which I believed to be a libel on both.

I have now read Mr. Smith's translation of Dr. Baldamus's theory carefully, and I must begin by confessing that I did the Dr. some wrong by attributing to him the notion that the cuckoo can colour its eggs at will, when Herr Kunz ought to enjoy the credit of this brilliant notion. I was, however, misled by Mr. Smith himself, who now accuses me of an "ingenious perversion of the theory," because I copied from his own paper in the 'Zoologist' (Zool. S. S. 1112) the words,—which, to make them more impressive, are there printed in italics,—“that the cuckoo is able to assimilate them (its eggs) in colour to the eggs of those birds whose nests she selects,” and this he there states is the opinion of Dr. Baldamus

himself, and I leave it to you and your readers to determine which of us has perverted the truth.

Mr. Smith is angry with English ornithologists, and accuses us of "indolent reluctance" because we have not been able to find evidence in support of Dr. Baldamus' theory. I have certainly felt some surprise that he and those who think as he does have not themselves brought forth in the past five years some evidence in its favour without going to Germany to seek it. That I may avoid making a second mistake, I will copy Mr. Smith's present interpretation of the Baldamus theory "that every hen cuckoo lays all her eggs of one colouring only, and consequently (as a general rule) lays only in the nest of one species," and I hope that Mr. Smith will not be offended if in "pleasantry" I translate this sentence into my own words, as I did before, that each species of bird honoured by its patronage has a family cuckoo.

With the first half of this sentence, "that every hen cuckoo lays all her eggs of one colouring only," I entirely agree, and will take it as my text; but that the instinct of each cuckoo leads it to lay its eggs amongst those of one species of bird only with which they shall agree in colour, is to me utterly absurd. Nature, however lavish, never wastes her resources, and I argue that this ingenious theory would be entirely wasted in deceiving birds which need no deception, and will sit with equal assiduity upon eggs of any colour, or upon pieces of chalk substituted in their places. I affirm that, as far as our English cuckoos are concerned and our experience goes, they invariably lay their eggs of gray or grayish brown, irrorated throughout with darker brown and marked always by some minute black spots, and that those eggs are laid, in the majority of cases, amongst the blue eggs of the hedgesparrow. Out of seven cuckoos' eggs in my own pleasure-ground six were in the nests of the hedgesparrow. It would require some research in the female, and she would have to carry her egg for a long time in her mouth before she could find any eggs less in harmony with her own; and since our cuckoos do not and will not lay blue eggs, shall we (as Sir Joseph Banks is said to have done to the fleas) anathematise them, or shall we come to the conclusion that our gray skies are to blame?

Mr. Smith extols the Germans for their "painstaking and very persevering diligence," and gives us long tables to prove it; but I contend that it is all worthless, and that they have no proof

whatever that any one of the eggs of which such accurate measurements are given were laid by the cuckoo, and I totally disbelieve that the cuckoo's eggs ever resemble those of the redbacked shrike or of the buntings.

An article appeared in the 'Field,' quite as well authenticated as anything that Dr. Baldamus has given us, attested by Herr Kiessel and two highly credible witnesses, who treated with contempt the notion that they could possibly be mistaken, knowing well the nightjar as well as the cuckoo: in this article it was affirmed that the cuckoo lays her eggs and hatches them herself upon the ground. What does Mr. Smith say to this from his painstaking German friends? "I beg to state without hesitation that *never* by any possibility does our British cuckoo either build a nest of her own or incubate her eggs on the ground."

W. C. HEWITSON.

Oatlands.

[I exceedingly regret the exhibition of acrimonious feeling on this question, which is certainly one of the most interesting ever introduced to the notice of ornithologists: true naturalists, those whose experience best enables them to form a correct judgment, and whose opinions therefore are most entitled to respect, frequently hold aloof from discussions of this kind from a dread of being drawn into a personal controversy: I know this was the case in 1868, and that in consequence the question collapsed: I fear a similar collapse now. Controversialists seem to ignore the fact that if not established on incontestible evidence, a theory, however specious, must fall into oblivion; and if so supported no argument can prevail against it. As bearing on this question, although collaterally and not directly, I may perhaps be allowed to state that it has been repeatedly stated, and I believe the statement remains unchallenged, that more than one foreign species of cuckoo lays in crows' nests, and that the eggs are *invariably* coloured like those of the crows.—*Edward Newman.*]

The Theory of Dr. Baldamus as regards the Cuckoo's Eggs.

By GEORGE DAWSON ROWLEY, Esq., M.A.

THE Rev. A. C. Smith having requested me to say something upon the Baldamine theory of the colouring of the eggs of *Cuculus canorus*, in the March number of the 'Zoologist,' I make a few final remarks.

Firstly. The cause assigned does not appear to be adequate. The lawful proprietor, as I find, never fails to hatch the intruding egg, without the supposed resemblance, with undeviating uniformity. Nature's rule is success. Mr. Darwin, in his 'Descent of Man' (vol. i. p. 79), under the head of "Moral Sense," speaks of the "strong feeling of inward satisfaction" which impels "a bird so full of activity to brood, day after day, over her eggs." With some diffidence I venture to disagree with so great a naturalist. There is no more inward satisfaction, in a moral sense, in a brooding bird than in an eating or drinking bird. The desire to sit is a burning, overwhelming one, which must be satisfied, like that of hunger and thirst. There is no moral sense in it. It is painful to the bird, which, as I have often seen, will sit on nothing rather than not incubate. Hence I contend that the cause assigned for the supposed resemblance of the eggs of the cuckoo to that of other birds is not satisfactory. Birds are only too glad to sit on the cuckoo's egg.

Dr. Baldamus says, "There must be proportionably many exceptions" to the rule. Query, do not the exceptions become so numerous as themselves to form the rule? I have parted with many of my specimens, but have still over sixty, which are with the nests or eggs of sixteen or seventeen species. Of these in two cases I *do* see a resemblance between the egg of *Cuculus canorus* and the others. They are cases of *Anthus pratensis* and *Motacilla Yarrellii*. But different persons view things variously, and an advocate of the theory might see other resemblances. Dr. Rey's list is compounded with great care, and I know what an amount of trouble and skill must have been exerted to procure those data. No doubt it tends to establish the theory. To be like the eggs of the redstart (*Phœnicura ruticilla*), the cuckoo must lay a blue egg, to resemble those of *C. arundinacea* it should be green or greenish. Such eggs have never come under my experience, so I can say nothing regarding them, except that I have studied monstrous specimens of eggs somewhat, and I observe that in the common fowl, when one egg is found inside another, and both have shells, as sometimes happens, the grain of the shell varies, though both are the produce of the same hen. I mention this with reference to the gigantic eggs named by Dr. Rey, and said to be those of *C. canorus* of a blue colour. A blue and a green egg of *C. canorus*, well authenticated, would do much to convert me. I do not affirm

that such do not exist; I only say that after some efforts I have been unable to find one, though I have discovered both gigantic and diminutive eggs of various members of the family of the Sylviads.

In Mr. Smith's remarks, for the most part, I concur, but must still consider that what has been published is only the inception of the matter, which is as yet *sub judice*. For these and kindred questions, we want to fall in with "Alexandro magno rege inflammato cupidine animalium naturas noscendi," of whom Lewes, in his 'History of Philosophy,' quotes Pliny as stating that he set all his hunters, fishermen, &c., to collect specimens of Natural History in the service of his tutor.

GEORGE DAWSON ROWLEY.

Chichester House, East Cliff, Brighton,
March 5, 1873.

The Eggs of the Cuckoo. By HENRY DOUBLEDAY, Esq.

I HAVE no wish to enter into a controversy about the eggs of the cuckoo, but as I assiduously collected the eggs of British birds for thirty years, and during that period saw a great number of the eggs of the cuckoo, I may be allowed to state I never met with anything to confirm the theory of Dr. Baldamus.

The eggs of the cuckoo are different from, and probably vary less than, the eggs of any British bird which have markings upon the shell. I have had a great many brought to me by birds'-nesting boys, and they never made a mistake.

I have several times seen the eggs of the cuckoo in the nest of the hedgesparrow and pied wagtail, but they have always been similar, differing only in some specimens being a little paler than others.

I very much doubt whether many of the eggs mentioned in the list really belonged to the cuckoo, and it is very remarkable that the hedgesparrow is not mentioned as one of the foster-parents, since, as far as my observation goes, the cuckoo more frequently places her eggs in the nests of this bird than in those of any other species.

I was surprised to see the wood wren in the list. I think this must be a mistake, on account of the construction and small size of the interior of the nest.

I cannot see any reason why the eggs of the cuckoo should resemble those of the foster-parents, as the generality of small birds will sit just as readily upon substituted eggs as upon their own.

There is nothing improbable in a hen cuckoo laying only eggs of a similar colour, as this frequently occurs with other birds. I knew an instance of a hen blackbird's laying all her eggs of a spotless blue; the first nest was taken, and a second nest was soon built near the same spot, and the eggs were exactly like those in the first nest: the female was probably a bird of the preceding year.

If the cuckoo has not a previous knowledge of what the colour of her eggs will be, how can she decide in the nests of which bird she is to place her eggs? Perhaps Dr. Baldamus supposes that she lays one first, and after examining it decides upon the bird which is to be the foster-parent of her young one.

HENRY DOUBLEDAY.

Epping, March 13, 1873.

The Cuckoo Question.—A fact that most naturally opposes itself in the minds of *British* ornithologists to the belief that the eggs of cuckoos resemble in colour those of the birds in whose nests they are introduced, is that, so far as I am aware, no one has ever found in the nest of a hedgesparrow a cuckoo's egg which is similar to that of the hedgesparrow. I should be extremely obliged if any one or more of your correspondents would, in the course of the coming breeding season, try whether the bird last named has any objection to foster eggs of a colour entirely different to its own, and communicate with me on the result of the experiment.—*Alfred Newton; Magdalene College, Cambridge.*—‘*Field.*’

Supplementary Remarks on the Propagation of the Cuckoo.

By the Rev. ALFRED CHARLES SMITH, M.A.

As in this month's 'Zoologist' I have again taken up my parable on the cuckoo (S. S. 3433), in reference to the colouring of its eggs, I am desirous to follow up the subject with some further observations in regard to another interesting particular in the economy of that

bird's propagation; *viz.* the means by which its foster-brethren are summarily ejected from the nest wherein the newly-hatched cuckoo appears; a question also much disputed amongst ornithologists, and for which I have valuable testimony from the pages of the same 'Journal für Ornithologie,' from which I quoted last month; though I would not then confuse the one question before me, by drawing off attention to another point. I return therefore now to the enquiry; and whereas last month I adduced the authority of Dr. Rey, whose investigations were conducted in the heart of Germany, I shall now have the pleasure of quoting Dr. Dybowski, whose observations were made in Eastern Siberia, and whose very interesting communication on the subject I beg to introduce in as literal a translation as I can make.

Let me first, however, remind my readers that in treating of the life-history of the cuckoo on a previous occasion (Zool. S. S. 1110), I ventured to state that it was not the newly-hatched, but the parent cuckoo, which cast from the nest the unfledged young of the foster-parents; and I mentioned in support of this view the honoured name of Charles Waterton, whose opinion was very decided on the point, as he plainly expressed it in his *Essays on Natural History*,* and as he repeated it to me on more than one occasion; inasmuch as he declared it to be absolutely impossible for any bird just hatched to exert itself to the degree required, since the ejection of the young birds from any nest would necessarily entail a considerable amount of physical exertion. Perhaps in my admiration for the attainments of that eminent ornithologist, I too fondly thought that the authority of Waterton would carry conviction to most minds on a question which required accurate observation and practical knowledge. I was soon however undeceived by Mr. Briggs, who advanced (Zool. S. S. 1208) on the opposite theory not only the name of Dr. Jenner, who originated the story of the precocity of the young cuckoo, but also that of Colonel Montagu, whom I will never mention without the respect which is his due: moreover Mr. Briggs had himself (though I had overlooked the circumstance) seen with his own eyes the attempted expulsion of a young pipit from its nest by an infant cuckoo (Zool. S. S. 914). Of course I am not about to dispute for one moment the testimony of either of these gentlemen, when they record that which they

* See the one vol. edition, 1871, edited by Norman Moore, pp. 317, 343, 555.

themselves have seen: perhaps however I shall be forgiven if I surmise that in each of these cases the young cuckoo had, either from the untimely end of its real mother, or from some other unforeseen accident, been left on the horns of a dilemma; and that then it had been taught by nature to exert itself to its utmost in order to obtain that sole possession of the nest which was almost necessary to its existence: not however in the period of its first infancy, when it would have been incapable of any such exertion, but in process of time, as it began to acquire strength enough to enable it to raise itself on its legs; and even then, be it observed, not always with success, as in the instance which Mr. Briggs so confidently puts forward as witnessed by himself, the young cuckoo, upon repeated attempts, signally failed to effect the ejection of its comrade, until aided by Mr. Briggs. However I proceed to state the evidence by Dr. Dybowski, as he gives it in his valuable communication to the 'Journal für Ornithologie.'*

"With regard to the theory that the newly-hatched cuckoo turns the young of its foster-mother, either mechanically or involuntarily, out of the nest, I cannot declare myself to coincide, since I have facts to produce which tend to quite different conclusions. For we found in an uninhabited valley near the river Alengui, in Dauria, a nest of *Anthus Ricardi*. It was inserted in a depression at the foot of a rather large heap of earth, whose surface up above projected over the nest on all sides to a considerable extent. In this nest there was only a young, still quite unfledged cuckoo, and from two to three days could barely have elapsed since it had crept forth from the egg. Not far from the nest two young pipits were lying, which were certainly still alive, though extremely feeble; and a little farther off, a similar young bird already dead. As we took the little birds in our hands, it was apparent that their crops were full and their stomachs also well filled. Nevertheless the poor things were so exceedingly cold that they gave hardly any distinguishable signs of life. Now the question arises, what could be the reason of this (at all events, to say the least of it,) involuntary abiding of the above-named young birds outside their nest? The young cuckoo certainly could not have caused it, as he was still much too young for such a task; the young pipits themselves could not have got out of the nest, because it lay much too deep down for

* Vol. xix for 1871, pp. 393—4. Zur Fortpflanzungsgeschichte des Kukkuks. Briefliche Mittheilung aus Ost-Sibirien.

them to have done so. There remains only the theory that the parents (either those of the pipits, or those of the cuckoo) must have done the deed. Of the pipits, there can surely be no question; indeed, in my opinion, in the case before us one can lay the blame solely and entirely on the cuckoo, and indeed on the female bird.

“Again: not far from Darasun, where several cuckoos had been killed a short time before, we found in the month of June, in a nest with a young cuckoo, a young pipit nearly full-grown. The young cuckoo could not yet leave the nest, nor did he even know how to make his escape out of it, to get away from us; so he sat still in his place, and hissed at us; whilst the young pipit could already run, and was just preparing to slip out of the nest away from us. In this case it must be assumed that there was none near at the proper time who could cast out the young pipit.

“Again: in one and the same nest, we found two cuckoo’s eggs, the colouring of which entirely differed, the one from the other.

“Again: in a nest of *Phyllopneuste fuscata* we found a cuckoo’s egg, green speckled with black, like that of *Uragus sibiricus*, which (as is well known) will not receive the egg of the cuckoo, but will rather destroy the nest, and remove its materials; but near the aforesaid nest, lay the eggs of the *Phyllopneuste*, of a pure white colour.

“Again: we often found damaged nests, some even torn asunder; the eggs of which were not eaten, but for the most part lay around, at a little distance from the nests, broken.

“The above facts, as well as many other cases, cause us to express the following opinions upon the cuckoo:—

“(a.) The female cuckoo lays her eggs in the nests of other birds; she does not cast out the eggs of those birds intentionally, and if this should sometimes happen it ought to be considered as done by accident.

“(b.) Every female cuckoo has her own district, and certain chosen nests, in which to lay her eggs. If she sees that another female cuckoo comes near this district, then she pursues it, and drives it away: but if the other female cuckoo is able to slip into such a district without being seen, then it may well come to pass that two cuckoo’s eggs may be laid in one and the same nest.

“(c.) With the spoiling of the nests and scattering of the eggs we must not charge the female, but in every case the male cuckoos,

which probably adopt these means to force their mates to a prolongation of the pairing-time. (Zur Verlängerung der Paarungszeit).

(*d.*) After hatching, the female cuckoo turns the young of her nurse out of the nest, in order to secure a more certain existence for her own offspring."

Dr. Dybowski concludes his paper by declaring that each one of the views he has put forward requires further confirmation, and entreats that careful observations may be made on each of these points. With these remarks of the worthy doctor I most cordially agree; for though I have my own opinions on the subject, I am by no means bigoted in their favour, and I cannot consider that we have as yet by any means arrived at any positive knowledge of all the strange circumstances which attend the breeding of that very peculiar bird, the cuckoo: and it is with the view of bringing forward any well-authenticated facts I can glean, and inviting discussion upon them, as well as hoping to elicit the publication of other observers' experiences on the same subject, that I so often harp (not however, I trust, to the weariness of the readers of the 'Zoologist') on this cuckoo note.

I had hoped to have concluded these remarks on the cuckoo, with an account of the well-being of a bird of this species which had passed most successfully through the greater part of its second winter in captivity in this neighbourhood, but which unfortunately died last month. It was taken from the nest at Potterne, near Devizes, in the summer of 1871, and was reared in the bakehouse of the chief confectioner in that town. Though it never attained to other than ragged plumage, the bird seemed lively and in good health, and in all probability would have survived this winter, at all events, if it had not been incautiously exposed to a draught of cold air in the bitter weather of last month, when it seemed chilled to the bone, and very soon drooped and died. This was the more to be deplored, as it had been carefully and constantly sheltered from the severity of winter, and had seemed to thrive in its exceptionally suitable place of abode; and it was only by a most unlucky accident that it was taken from its customary warm quarters, for a few minutes, to be shown to a neighbour, when it caught the chill which proved fatal to its existence. It survived, however, longer than any other

cuckoo brought up from the nest in this country which has come under my personal notice.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
March 3, 1873

Postscript.—Since writing the above, I have received a letter from my friend Professor Newton, in which he demurs to my somewhat sweeping accusation of apathy on the part of British ornithologists in regard to the subject of Dr. Baldamus' theory, and points out how he himself had handled this question in an article which he had sent to 'Nature,' (No. iii. Nov. 18, 1869), and how that article had been followed by sundry communications on the subject in subsequent numbers of the same periodical. It therefore becomes me to apologise to my friend for such apparent, though most unintentional, disregard of his article on the question. Most assuredly I should be one of the last voluntarily to overlook the published opinion of one I esteem so highly as Professor Newton, and the more so when that opinion was given on a question in which I am deeply interested; but in real truth it was not until my paper on the cuckoo in this month's 'Zoologist' was in type, that I was aware that he had written on the subject; for it is one of the drawbacks which naturalists who live in rural districts must suffer, that it is impossible for them to get sight of all the many Natural History publications which seem to multiply in number with every month; nor had any of my ornithological friends chanced to call my attention to the paper in question. I have now obtained a copy of that paper, and have read it with great pleasure, and am delighted to find that the Professor agrees so entirely with Dr. Baldamus, whose rules he completely endorses. Let me not, however, be deemed perverse and obstinate, if I still maintain that no British ornithologist, so far as I can ascertain, has yet investigated this question in the systematic way, and after the excellent example of painstaking and diligence set us by Dr. Baldamus and Dr. Rey, neither of whom entered upon the subject until he had carefully studied every particular in colour, markings and size, not only of a large series of nearly one hundred cuckoos' eggs, (Zool. S. S. 1150), but also (what was little less important) of the eggs of the foster-parent with which they were severally found. That British ornithologists should be able to examine so large a

number of cuckoos' eggs in this country, I do not think possible, because I imagine the cuckoo does not abound in our more thickly populated land, as it does in some parts of Germany : still, if every enquirer, who may chance to meet with one single cuckoo's egg in the coming season, would make a point of very accurately describing its size, colour, and markings, and those of the other eggs found with it, (assisting his description with a water-coloured drawing, if practicable) we might by degrees, and by the experience of many, gain a mass of information which would be of the greatest value as well as interest ; and this I again heartily commend to the attention of all out-door observers. Let me, however, once more remind my readers that there are avowedly and of necessity, many exceptions to the rule (if rule there be) of the similarity of colour between the egg of the cuckoo and those of the nurse to which it is entrusted, as was pointed out by Dr. Bal-damus, who indeed took pains to repeat and dwell upon this caution.

A. C. S.

March 6, 1873.

Notices of New Books.

Autumns on the Spey. By A. E. KNOX, M.A., F.L.S., &c. 172 pp. post 8vo ; four litho. plates by Wolf. London : Van Voorst, Paternoster Row. 1872.

MR., or as he is usually called "Captain," Knox, is always an agreeable, and often an instructive companion, but as he advances in age he loses, as we all do, the vigour and freshness of youth, and trusts rather too much to his book-learning for what is irreverently called "padding." One would have fancied that his theme, the breezy hill-side and the "foaming river," would have sufficed him for materials without unapt quotations from Herodotus, Geoffroy St. Hilaire, Gordon Cumming, Bishop Stanley or Hugh Miller, and that the spirit of the motto he has taken for his first chapter would have led him to trust for inspiration exclusively to Nature in her unadorned beauty, as revealed in the river and the hill-side : here is the motto, and nothing could be more appropriate or harmonize better with the author's subject :—

"The river nobly foams and flows,
The charm of this enchanted ground,
And all its thousand turns disclose
Some fresher beauty varying round;
The haughtiest breast its wish might bound,
Through life to dwell delighted here;
Nor could on earth a spot be found
To Nature and to me so dear."

But Mr. Knox has introduced into his little book the apocryphal story of

"That clever bird on the banks of Nile
That picks the teeth of the crocodile,"

and that other little bird that warns the ponderous rhinoceros of the approach of his ruthless murderer, and has detailed *in extenso* the somewhat threadbare discoveries in "old red" made by our friend Miller, chronicled in all our memories, and copied into all our books, long, long ago: thirty years, a generation, have passed away again since those wonderful creatures *Pterichthys*, *Coccosteus* and *Cephalaspis* were figured and described in the 'Zoologist,' to astonish the simple and perplex the speculative, who hesitated to decide whether they were endosteate or exosteate. It is pleasant to see such speculations revived, and to read of Mr. Knox's researches at Tynet Burn, which if they do not emulate those of Hugh Miller, at least testify to a lively interest in his discoveries.

Before I quite relinquish the critic's pen, I may state that some of Mr. Knox's expressions are not in exact accordance with my own ideas of cosmical phenomena; thus the Scotch firs, which we see on many of the Scotch hills, are called, at pp. 10, 58, &c., "primæval pines." I will not assert that these pines are not "primæval," but their appearance, and I am very familiar with them, seems to bring the rather indefinite period expressed by that word much nearer our own time than I had supposed. This primæval vegetation afforded our author an opportunity of observing a flock of crossbills splitting the fir-cones and extracting the seeds.

"I was especially surprised at the total absence of all kinds of small birds, some of which, such as the great tit, the blue tit, or their congeners, the marsh or the cole tit, I should have expected to see or hear even at this season, or at least to have caught a glimpse of some feathered inhabitants of the forest. This circumstance had just recurred to my memory with redoubled force, as

I perceived by the declining sun that the evening was approaching, when suddenly a singular, continuous, shrill chirping sound reached my ears, as of several small birds together, but the notes were strange to me. Although well acquainted with the call of most British birds, I could not recognize this one, and the longer I listened the more I was puzzled. Gradually it approached, and seemed to proceed from one of the taller Scotch firs at a little distance. Fixing my eyes on the spot, I soon saw several little birds, something larger than bullfinches, emerging from the foliage, and flying one by one towards the tree that was nearest to me, alight on the very boughs that hung over my head. I could hardly believe my eyes, as I realized the delightful fact that I was actually within a few yards of a whole family of crossbills (*Loxia curvirostra*), busily engaged at their marvellous employment of splitting the fir-cones and extracting the seeds. Need I say that the recollection of previous bad luck, and even my sufferings from the gnats, were obliterated by such an interesting sight, not the less welcome from its being so unexpected. The very plumage of these little creatures added to the charm of their presence. Some were of a beautiful deep crimson colour, others orange or yellow; others, again, were clad in a plain brown livery, and all were busily intent on their occupation of rifling the cones, during which they kept flying about from one twig to another, incessantly uttering their shrill monotonous notes. After close observation, I noticed that they seldom attempted to operate upon a cone on the exact spot where it grew, but after snapping one off from a slender terminal twig, each bird would hop or fly to the central part of the branch, and in parrot-like fashion hold it in his foot, but more frequently *under* it, as a hawk holds a small bird when in the act of devouring it, and quickly inserting his bill between the scales split them open by means of that wonderful tool, and extract the seeds with the greatest facility. Occasionally a cone would fall to the ground just as it was snapped off; but, in such a case, a fresh one was instantly selected, no further notice being taken of the one that had dropped. Their powers of climbing appeared fully equal to that of the titmice, as they swung about in all directions and in every imaginable attitude, twisting and twirling, fluttering and chattering, within a few yards of me, and evidently quite unconscious of my presence."—P. 33.

Mr. Knox dwells at considerable length on the singular manner in which the squirrels have immigrated and emigrated into and from different localities they frequent. The story of their having been introduced by a lady who had admired their lively habits and sprightly attitudes in England receives collateral support from that observant naturalist, Dr. Gordon, who attributes their introduction into this district of Scotland to Lady Lovat in 1844. A story is told of a squirrel having ascended a man in the treeless region of

the glen of Holme, greatly to his discomfiture, he never having before seen an example of "the queer wee beastie": the tale shows that the squirrel was unfamiliar in that region.

I was rather surprised and very much pleased to find a word in favour of the otter: it is so common to hear it condemned by any resident in the country, in the same unsparing manner as the diurnal and nocturnal mousers, the kestrel and the owl, that one seems hardly to believe one's eyes when a passage like this meets the astonished gaze:—

"The otter (*Lutra vulgaris*) still survives, though gradually yielding to persecution. I have long felt satisfied that the depredations of this beautiful and graceful quadruped are far less serious than is generally supposed. In the smaller streams and burns they certainly consume a number of trout; but, as a set off to this, they kill quantities of pike, wherever that voracious fish has contrived to establish itself. As to salmon, they rarely capture one of considerable size, while the arch-enemy of the species, the seal (*Phoca vitulina*), has become quite a rare visitor to the mouth of the Spey. I have seen a greater number in one day off the Moy, in Killalla Bay, than could probably now be observed during an entire season on the southern side of the Moray Firth."—P. 56.

I sincerely regret that I am unable to corroborate this view of the otter's conduct: having seen and heard much of otters in Herefordshire, I have failed to find evidence of its pike-destroying propensities, while its taste for the delicate grayling, the beautiful trout, and the coarse roach and dace, is established on the clearest evidence.

It would have been pleasant to have learned more particulars of that reputed Scottish mammal, the wild cat; but of this mythical creature Mr. Knox saw but one, and that in a "large iron cage." There is no British mammal, or reputed British mammal, of whose character, locality, and even existence, we are so totally ignorant as the wild cat; and it is fair to assume that Mr. Knox would have gladly imparted any information he possessed respecting it. Dr. Gordon includes it in his "Fauna of Moray" (Zool. 423), and gives the following meagre information respecting it:—

"*Wild Cat*.—Found only in the largest forests and among the subalpine rocks and valleys of the province. One killed above Cawdor Castle measured from the nose to the tip of the tail three feet nine inches, of which the tail itself occupied fifteen inches."

I pass on to the golden eagle, and concerning this monarch of Scottish birds I find details of great interest. In 1862 Mr. Knox passed a week or ten days in the forest of Braemar, in the very heart of the Grampians, and had the gratification of seeing this royal bird almost daily, and of observing peculiarities which have escaped the notice of ornithologists generally; for instance, his hovering like a kestrel, and his nesting in fir trees, or as Mr. Knox would prefer calling them “primæval pines.” He first saw the golden eagle soaring at a great height, and every now and then arresting his career and hovering in the air like a kestrel, apparently watching for some victim in the heather below: he was attended by a “rabble rout” of hooded crows, who kept up their pertinacious annoyance as long as he remained in view. Braemar was once the paradise of the naturalist, but it is now forbidden ground; for one cannot write half-a-dozen lines about this wild district without making the “angry passions rise” of those who would wander and those who would prevent from wandering. A tourist in the wilder parts of Scotland must now lie submissive in the arms of gillies, foresters, keepers and rangers, *et id genus omne*, as does an infant in the arms of its nurse; or must submit to the bullying and badgering that no Englishman can relish; but I return to the eagles and Mr. Knox.

“My surprise, however, was not greater than my delight when the forester pointed out the royal nest on an old Scotch fir tree, which, with several others, at some distance from each other, studded the side of a hill near the base of Ben-y-Bourd. Every ornithological authority that I was acquainted with had invariably assigned lofty inland crags and precipices to the golden eagle as the situation of his eyrie; and, indeed, the high cliff behind Corriemulzie, where he used to breed, owes its present title to the circumstance, but this was the only instance I had ever known of the nest being constructed in a tree. Such is the result of preservation, or in other words, the absence of persecution, for the services of the eagle have been long appreciated and the birds themselves protected by the proprietor of the forest, so that it would really appear as if the establishment of confidence had rendered them less anxious to select an inaccessible position for their eyrie. The nest itself was not above twenty feet from the ground, built on one of the larger horizontal branches extending from the naked trunk; and with the assistance of a gillie I succeeded in climbing to it and examined its structure and contents. The enormous fabric was about eight feet wide. Some of the external sticks of which it was composed were nearly as thick as my wrist, their size gradually diminishing towards the

centre, which was lined with birch twigs and heather. In the interior was an addled egg, where it had remained since the previous spring, white like that of the sea eagle, and without any of the ferruginous or reddish colour that is more characteristic of the golden eagle's—although this pale variety is occasionally found even among prolific eggs of the latter species. Besides this the nest contained several large wing- and tail-feathers of the owner, a quantity of down from the young birds, the foot of a blue hare, the wing and leg of a ptarmigan, and the half-devoured body of a recently-killed hooded crow. It was evident that the parents still used it as a larder, which was satisfactorily explained, a few days afterwards, on my perceiving two immature golden eagles, whose ringed tails were distinctly visible through my spy-glass, flying about the tree and alighting occasionally on the ground, evidently expecting to be fed by their parents, neither of whom, however, appeared on that occasion, although repeatedly summoned by the loud screams of the younger birds.

“For several years the golden eagle has established its eyrie on a Scotch fir in this forest. A stout bough, with strong lateral branches, is selected in the first instance, and the nest, such as I have described, constructed on the platform. In the following spring the fabric, even when apparently uninjured by the winter storms, is added to, or ‘put out,’ as the foresters call it. The same process is repeated annually, until at length the overburdened bough gives way and snaps off, carrying with it to the ground the accumulated mass of sticks, brushwood and heather, and next year a new tree is chosen for the eyrie, sometimes at a great distance from that which had been previously occupied.”—P. 141.

I am happy to agree entirely with Mr. Knox as to the innocence of the dipper. I have attentively studied its habits both in Scotland and Wales; have examined it alive and dead; have found abundant evidence of its feeding on caddis-worms in all their marvellous multiplicity of form and structure; but never could obtain a tittle of evidence that it sought after the spawn of trout or of salmon, or of any other fish. I regret that the Rev. George Gordon, of Birnie, should ever have stooped from his high position as a naturalist to pen a paragraph for the ‘Zoologist’ (Zool. 505), which confirmed the persecutors of this poor bird in its ruthless destruction. I will cite the objectionable passage:—

“The rocks of Killas on the Lossie is a favourite haunt of the ouzel; it was observed there, by one of the water bailiffs, to contend with the common trout in carrying off and eating the ova of the sea trout, even at the very time that the latter was lying and shedding its spawn on the reeds or spawning ground. From its known partiality to, and destruction of, the

spawn of the salmon tribe, this bird has probably obtained no enviable place in the following distich:—

“The Gordon, the guile,* and the water crow
Are the three warst ills that Moray ever saw.”

So this innocent bird is ruthlessly slaughtered on the evidence of an old wife's fable, backed by the assertions of an ignorant water bailiff. The burning of witches for *impossible* acts is happily abandoned: when shall we obtain a little immunity for our owls and our hedgehogs and our goatsuckers, our water ouzels and our swans. It is grievous to find Dr. Gordon writing of the dipper's “known partiality to, and destruction of, the spawn of the salmon tribe”; but let us hear Mr. Knox:—

“Of the many indigenous birds unjustly proscribed and gradually diminishing in number, the water ouzel or dipper (*Cinclus aquaticus*), appears to me to be the most flagrant example, and I gladly avail myself of this opportunity of recording my belief that he is not only an injured innocent but an ill-used benefactor. For ages he has been condemned as a supposed devourer of trout and salmon spawn, but I am convinced that such a charge has no more foundation in truth than the once popular fables of cows and goats being milked by the hedgehog and the nightjar. I have had many opportunities of observing this bird narrowly, more frequently in Ireland and Wales than even in Scotland, and I may add, though not without a slight pang of remorse, that in the stomachs of the many specimens I have shot and dissected, even when in the commission of the supposed act of larceny, I never could detect any portion of the spawn of either trout or salmon. Let us for a moment watch the manœuvres of a dipper. The scene shall be one of his favourite haunts, the rocky banks of a mountain burn or the gravelly shallows of a larger stream. Perhaps you are quietly seated among the heather above, resting during the heat of an autumnal noon, and admiring the various colours of the mosses, lichens and Lycopodia that clothe the margin. You are struck by the loneliness of the scene. Nothing living appears to animate it. Suddenly a water ouzel darts by, in swift, even flight, close to the surface, and alights on a flat stone in the middle of the burn lower down. You are no less struck by his beauty—his snow-white breast contrasting with his otherwise dark plumage—than with his attitudes and performances: nodding his head and jerking his short tail after the manner of a wren, and then suddenly plunging into the stream, where you lose sight of him until he reappears on the surface in a few seconds a little lower down, and perhaps resumes his position on the same rock, or flies to a stone nearer the bank. You have probably read or heard

* The guile is *Chrysanthemum Segetum*.

that he can dive with facility and walk about at his ease on the gravelly bottom. Now is your time to watch his actions under water, and to judge for yourself. You run quickly towards the spot, but are careful to check your speed and lie down before you reach it, lest you should alarm him prematurely. Again he rises from the burn, rests for a moment on a stone, and soon disappears once more beneath the surface. Now you repeat your former manœuvre and reach the margin in time, above the very spot where he has just plunged into the clear shallow stream, and, looking down, you distinctly see him struggling with violent efforts to reach the bottom, towards which his head and neck are already protruded; working his wings all the time with considerable exertion and *apparent* difficulty, quite unlike the comparatively facile movements of a coot or cormorant or any bird of similar specific gravity when in the act of diving. Now he seems to clutch the round pebbles for a few seconds, and to be employed in extracting something from among them; but the ripple of the current prevents more accurate observation on your part. At last he comes once more to the surface, and, alarmed at your presence, darts along the burn. His flight is as even as that of a partridge, and he presents an easy shot. To satisfy yourself of his guilt or innocence, you—reluctantly—pull the trigger, and he floats lifeless on the stream. Now for the trial. You carefully dissect his crop and stomach and examine their contents, and you discover several larvæ of Phryganæ and Ephemeræ, minute beetles, and other aquatic insects, and several very small fresh-water snails, but you search in vain for the ova of trout. Such an incident as I have just hurriedly described has occurred to myself repeatedly, and the result of my observations induces me to believe not only in the harmlessness of this interesting little bird, whose spring song, by the way, is exceedingly melodious, but that instead of being a destroyer of fish-spawn, he really assists in its preservation, by acting as a check on the increase of various predacious water-beetles and other aquatic insects whose ravenous grubs or larvæ furnish his favourite food. His persecutors are therefore, in my humble opinion, amenable to the double charge of injustice and ingratitude.”—P. 150.

And now I close a book which has given me so much pleasure that I can do no other than cordially commend it to my readers: it is delightful to contemplate the taste for Natural History thus carried into the decline of life. I could gladly have been spared the “details of death,” but the very word “sportsman” implies the love of killing: Mr. Knox has shown us that this can in some degree be mitigated by a taste for Natural History.

EDWARD NEWMAN.

Large Otter.—With regard to the otter whose capture I mentioned in a previous number (S. S. 3304, 3407), I ought perhaps to have designated it a *heavy* rather than a *large* otter. It was not nearly so long as one or two others which I had seen in previous years, but it was the most bulky specimen that had ever come under my observation, and it undoubtedly was of an unusual size, as the old fisherman—to whom an otter is not an unfamiliar creature—sent for me to inspect it, as he had never seen one of like dimensions before. Its length, which I took at the time, was just under forty-eight inches, but its tail seemed short in proportion to its bulk. It was a male, and reached the extraordinary weight of fifty-three pounds and a few odd ounces. The fisherman's son had fortunately noted down its weight at the time it was weighed, and although I was somewhat uncertain about its exact weight without consulting him, yet I knew it weighed something less than half a hundred weight. I may state that the specimen in question was of a very dark rich brown colour, and not of that rusty hue which I have sometimes seen. It was taken at a part of the river where several kinds of fish are very abundant, being preserved, and where the fortune of "a fine salmon" not unfrequently rewards the patience and tact of some disciple of Izaak Walton.—*G. B. Corbin; Ringwood, Hants.*

The Pigmy Hippopotamus (not Guy Fawkes).—This specimen of the extremely rare Liberian Hippopotamus (*Chæropsis liberiensis*) from Scarcies River, just north of Sierra Leone, arrived at Liverpool last week, but it unfortunately died on Friday, almost as soon as it reached its destination, Dublin. This second true hippopotamus was first described in 1844 by Dr. Morton, of Philadelphia, in the 'Journal of the Academy of Natural Sciences' of that city. Prof. Leidy, in 1850, showed that its peculiarities rendered its differences from Hippopotamus more than specific, and in 1852 gave it the generic name by which it is now known. The full-sized animal is said to be no larger than a heifer, and the specimen under consideration, which was at least seven weeks old, weighed only 23 lbs., whereas the one born in London last November weighed just upon 100 lbs. shortly after birth. But the chief peculiarities of the genus *Chæropsis* are found in the teeth, as there are only two lower incisors instead of four, and the anterior premolars remain functional throughout the life of the animal, instead of being lost as is the case in Hippopotamus. In addition to these points, in which *Chæropsis* is peculiar, it may be mentioned that the top of the head is convex instead of concave, the central upper incisors are slightly smaller than the outer, instead of larger, and the premaxillary bones are less developed than in Hippopotamus, from a young one of which, as M. A. Milne-Edwards remarks, 'it would be difficult to distinguish it externally.'—*Nature,* March 22.

[The anonymous author of this paragraph has made a mistake in saying that this little creature is a *true* hippopotamus, when he shows us

that he is perfectly aware that the genus *Chæropsis* has been instituted, and very properly, purposely to receive it: the following additional particulars are extracted from the 'Field' of the same date.—*E. N.*]

The animal stands not much higher than the largest wild boar, only very much more bulky in the body, and it has a proportionally shorter head than is that of the now familiarly known huge hippopotamus, exemplified by the pair, with their offspring, which are living in the Regent's Park. I further remarked that it was well to have an opportunity to bring to notice this small hippopotamus, as it might lead to travellers and others directing their attention to the animal, and to the much-needed acquisition of skulls and other specimens of it, for the museums of this part of the world. Until a few days ago I believe that I am correct in asserting that there were no spoils of it whatever in any European museum, with the exception of a skull in that of Paris, which has been minutely described by Professor Milne-Edwards. Yet the animal is known to abound in the interior of the free black colony of Liberia; and Dr. Gobeen, of Munrovia, informed Professor Morton of Philadelphia, that it is plentiful in the river St. Paul, and that it varies in weight from four hundred to seven hundred pounds. "They are slow and heavy in their movements," remarks Dr. Gobeen, "yet will sometimes stray two or three miles from the river, in which situation they are killed by the natives. They are extremely tenacious of life, and almost invulnerable, excepting when shot or otherwise wounded in the heart. When injured they become irritable and dangerous, but are said by the natives never to attack them when in their canoes. The negroes are very fond of their flesh, which seems to be intermediate between beef and veal. This specimen was brought by Mr. Pope Hennessey. It was obtained by Governor Hennessey from Mr. Pria, who, with himself, was officially employed on the west coast of Africa. He purchased it from a Mandingo trader, and it was kept for some time at the Government House at Sierra Leone.

Perception in the Lower Animals.—Many years ago I was on a mail-coach, and as soon as we came to a public-house the coachman pulled up for the fraction of a second. He did so when we came to a second public-house, and I then asked him the reason. He pointed to the off-hand wheeler, and said that she had been long completely blind, and she would stop at every place on the road at which she had before stopped. He had found by experience that less time was wasted by pulling up his team than by trying to drive her past the place, for she was contented with a momentary stop. After this I watched her, and it was evident that she knew exactly, before the coachman began to pull up the other horses, every public-house on the road, for she had at some time stopped at all. I think there can be little doubt that this mare recognized all these houses by her sense of smell. With respect to cats, so many cases have been recorded of their returning from a

considerable distance to their homes, after having been carried away shut up in baskets, that I can hardly disbelieve them, though these stories are disbelieved by some persons. Now, as far as I have observed, cats do not possess a very acute sense of smell, and they seem to discover their prey by eyesight and by hearing. This leads me to mention another trifling fact: I sent a riding-horse by railway from Kent *via* Yarmouth, to Freshwater Bay, in the Isle of Wight. On the first day that I rode eastward, my horse, when I turned to go home, was very unwilling to return towards his stable, and he several times turned round. This led me to make repeated trials, and every time that I slackened the reins he turned sharply round and began to trot to the eastward by a little north, which was nearly in the direction of his home in Kent. I had ridden this horse daily for several years, and he had never before behaved in this manner. My impression was that he somehow knew the direction whence he had been brought. I should state that the last stage from Yarmouth to Freshwater, is almost due south, and along this road he had been ridden by my groom; but he never once showed any wish to return in this direction. I had purchased this horse several years before from a gentleman in my own neighbourhood, who had possessed him for a considerable time. Nevertheless it is possible, though far from probable, that the horse may have been born in the Isle of Wight. Even if we grant to animals a sense of the points of the compass, of which there is no evidence, how can we account, for instance, for the turtles which formerly congregated in multitudes, only at one season of the year, on the shores of the Isle of Ascension, finding their way to that speck of land in the midst of the great Atlantic Ocean?—*Charles Darwin*; ‘*Nature*’ of March 13.

Shorteared Owl in Nottinghamshire.—Whilst shooting at Ramsdale, on the 23rd of December, we put up eight of these birds: we found them in a gorse cover. Is it not unusual to find so many together? If it had been earlier, one would have thought that they had only just arrived. There are several about the same place now.—*J. Whitaker, jun.*; *The Cottage, Rainworth, Notts.*

Great Gray Shrike.—A fine old male was killed at Lambly, about the middle of December. The bird was in beautiful plumage.—*Id.*

Great Gray Shrike near Newbury.—A very fine specimen of the great gray shrike was shot near Newbury on the 21st of November, 1872: I saw it in the flesh: I think it was a bird of the year. The great gray shrike is extremely rare in this immediate neighbourhood.—*W. H. Herbert*; *Newbury.*

Supposed Redwing's Eggs.—The eggs which Mr. Whitaker sends are certainly blackbird's: the female bird was probably one of a late brood last year.—*E. Newman.*

Firecrested Regulus at Torquay.—On the 6th of March a beautiful female of the firecrested kinglet was brought in the flesh to Mr. Shopland, naturalist, at Torquay, who informs me that it is the first he has met with during his long experience in this district.—*J. H. Gurney; Marlton, Totnes.*

Waxwings at Bishop's Lydeard.—A waxwing appeared on my lawn yesterday. It was about the middle of the day, when the gardener had left for his dinner, and everything was quiet, that I chanced to look out of window, and saw the pretty stranger under the same tree where I had previously seen one on the 7th of last month. I watched the bird both from an upper and lower window, and, the sun shining bright at the time, I had a very clear view of it. A hawfinch has also been paying me repeated visits for some days past, and this bird is nearly as great a stranger in this part of the country as a waxwing.—*Murray A. Mathew; Bishop's Lydeard, March 23, 1873.*

Ray's Wagtail.—The late Rev. Gilbert White, of Selborne, evidently confounded the gray and yellow wagtails, as he says, "Wagtails, both white and yellow, remain with us the whole year;" and I am convinced that Mr. Wharton (S. S. 3455) has made the same mistake. The birds which he saw in January, "feeding at the edge of a water-cress bed," were no doubt gray wagtails, adult specimens of which are of a brilliant yellow on the under parts. The yellow wagtail never arrives before April, and is not attached to water like the gray wagtail, but frequents open fields and commons. I do not think that the state of the weather here in the spring can have any effect upon birds, when they are in their winter quarters in Africa; they generally arrive here about the same time every year, but if the weather happens to be cold and stormy they do not sing, and are not observed. I have seen the grasshopper warbler creeping about the hedge-banks, like a mouse, when there was not a leaf to hide it; and Wilson, in his 'American Ornithology,' says the summer birds of passage generally arrive in the United States about the same time, whether the spring is early or late, and that he has often seen them skipping about the leafless boughs in a late spring.—*Henry Doubleday; Epping, March 13, 1873.*

Abundance of Snow Buntings, Song Thrushes and Bramblings in the North.—At Formby, on the Lancashire coast, on Shrove Tuesday, 1872, I shot five snow buntings from a small flock of sixteen which had been with us all the winter; and being in want of some more this year, I went again, also on Shrove Tuesday, during the late snow-storms, and killed four light-coloured ones out of a flock of about thirty. I also killed a few bramblings out of a very great number seen, and above three dozen song thrushes as they flew over towards the coast line in an almost uninterrupted stream: every field had a scattered flock in it of from twenty to fifty birds each, whilst on my warren there must have been two hundred in one flock. Three days afterwards the thrushes not captured or killed had left us; but

since I saw seventy dozen dead in one house, a tolerable idea of the numbers taken by the birdcatchers may be formed. Sky larks, which up to that day were very scarce, came with the thrushes, but no fieldfares or redwings were to be seen. Having offered a birdcatcher a good price each for all the snow buntings he could get me alive, he has up to now secured me upwards of thirty birds, which are doing well in my aviary,—rather more than I hoped for, but a harvest he was too wise to leave ungathered, in the face of a hard winter and dear coal.—*C. S. Gregson; March 6, 1873.*

Hawfinch and Brambling at Ringwood.—Considerable flocks of bramblings have visited this neighbourhood during February, and some I have seen were in superb plumage. They congregated much with sparrows, greenfinches, yellowhammers, &c., amongst the stacks of the farmers' corn and hay, and I fear that many of them were wantonly killed, as one man boasted to a friend of mine that he had shot more than a score for his ferrets. I have also seen several hawfinches, but they appeared to be exceedingly shy and wary. A few days ago a gardener brought a specimen he had killed whilst in the act of pulling up some of his early peas. It is not a very rare bird in this neighbourhood, and I have no doubt it sometimes nests in the New Forest, although I have never met with the eggs or nest there, and do not know of any one who has, but I once saw a pair of the old birds in the forest in the summer, and on two occasions I have seen young or immature specimens from the locality. Their usual food is, I believe, the seeds of the hornbeam or garden fruits, and as the former is rare and the latter are not frequent in the forest, the birds of necessity are compelled to seek a more favourable spot for nidification and its requirements.—*G. B. Corbin.*

Kingfisher and Hawk at Sea.—During a voyage, a few years ago, a kingfisher took refuge in the rigging of the ship 'Chatham,' and was shot, the vessel being then in the centre of the Gulf of Aden, seventy miles distant from the nearest land. Shortly afterwards the carpenter at work on deck was "taken aback" at seeing his favourite pigeon's head fall beside him. Looking up, he saw a small hawk devouring the rest of its body in the mizen top. In great wrath the man summoned the captain to take vengeance on the murderer, and the hawk (believed to be a sparrowhawk) was also shot, but unfortunately fell overboard. I do not know if the kingfisher was our common English species or the little Indian kingfisher. Both are included in Shelley's 'Birds of Egypt,' the former as "abundant," the latter as "not so common."—*Henry F. Bailey.*

Little Bustard in Hants.—A female specimen of the little bustard was shot on the 4th of January in a turnip-field on the farm of Mr. Twitchen, at Whitchurch, near Andover, and has since been presented to the collection at the British Museum, as recorded by Mr. R. B. Sharpe in the 'Field' of January 18th. Mr. Twitchen has himself informed me of the correctness of the date of this capture.—*Henry Reeks; East Woodhay.*

Spotted Redshank.—A beautiful specimen of this bird was shot on the side of a small pond in Beetwood Park, last August. There was another with it, but the man only having a single-barrelled gun it escaped.—*J. Whitaker, jun.*

Gray Phalarope and Pike.—The gray phalarope seems to be comparatively rare along the Hampshire coast during the winter. One has been taken, I believe, near Poole, but it is the only record I have seen. In 1870 this handsome little bird was taken in some numbers in this neighbourhood, and I saw a small flock of six or seven on several occasions in different parts of the River Avon. I also saw one which was shot on the river some twenty miles from the sea. During the same winter a fisherman brought me a specimen which he obtained under the following circumstances:—He had shot the bird, which had fallen upon a pile of weeds in the bed of the river, and as he was rowing towards it he distinctly saw a large pike rise and take the bird the instant it fell. The fish, however, was either mistaken in his victim or such a feathery mouthful did not exactly suit him, for he immediately threw the interesting little bird up again, when it was secured by the fisherman.—*G. B. Corbin.*

Black Swans.—On Sunday, the 9th inst., about 7.30 in the evening, two black swans (*rara aves in terra* of the poet, *Cygni atrati* of the learned) were seen wending their way along the coast at Walton-on-the-Naze from the direction of Felixstow and Harwich harbour. They flew about ten yards above the sea and fifty from the shore, passed the old jetty and took a peep at the new, and then onwards towards Clacton. An enthusiastic sportsman—spite of the Sabbath and gun-tax—set off from the hotel in a boat, on murderous thoughts intent, and at Frinton he came up with his quarry, and fired his shot, which missed the swans, but, report saith, hit a girl standing on the shore. Disgusted with their inhospitable reception, the swans wended onwards, and were next heard of on the main at Bradwell, opposite Mersea Island, where A. Mussett found, shot, and killed one. He positively says that the bird which escaped had no white on the wings, and was more black than the one captured, which was a male, with an entirely empty stomach. Will any swan-keepers on the eastern coast inform me if they have lost two black swans from their lakes or ponds? And will Z. account for the entirely black bird? Most of your readers are aware that Australia is the peculiar home of the black swan, and that it has never appeared in Europe in a wild state. Still, extraordinary things do happen, as for instance when the spine-tailed swift was shot near Colchester, and the Egyptian vulture was killed at Peldon—to say nothing of the sand grouse which a year or two ago paid a visit in force to our shores.—*C. R. Bree; July 25.—From the 'Field.'*

Ferruginous Ducks and Gadwalls in Leadenhall Market.—My brother procured two ferruginous ducks (*Anas Nyroca*) on the 29th of January, in the plumage of the first year, sex unascertained; and two gadwalls (*Anas*

strepera), apparently both young males, on the 30th January, from Leadenhall Market; the latter birds were from a Lincolnshire decoy.—*H. Durnford*; 1, *Stanley Road, Waterloo, Liverpool, March 9, 1873.*

Gadwall in Ireland.—Seeing the extreme rareness of the gadwall in Ireland mentioned in Mr. Harting's most useful 'Hand-List of British Birds,' I beg to record the appearance of a young male that was shot on Lough Erne, Co. Fermanagh, by my brother (H. V. Brooke), in the month of February, 1866, and is now in our collection.—*A. B. Brooke; Colebrooke, Ireland.*

Note on the Early Assumption of Breeding Plumage in the Bridled and Foolish Guillemots and Great Northern Diver.—Through the kindness of Mr. Shopland, birdstuffer, Torquay, I had the opportunity of examining the following specimens, which were obtained in Torbay on the undermentioned dates in December, 1872:—

December 21st. A bridled guillemot in full breeding dress.

„ 26th. An adult female great northern diver, which showed a considerable advance towards attaining the breeding dress on the wings, back and rump, and slightly so on the lower part of the throat. Two other specimens of this diver shot the same day were in full winter dress, and showed no signs of change.

„ 28th. Two foolish guillemots, one in full breeding dress and the other about half-way advanced in the process of its assumption.

In all the above cases the breeding plumage appeared to me to be without doubt newly assumed, and not the remains of the breeding dress of the spring of 1872. Possibly the mild weather which characterized the month of December last conduced to the early assumption of breeding dress in the instances here recorded.—*J. H. Gurney; Marlton, Totnes.*

Glaucous Gull in Nottinghamshire.—One of these fine birds was shot on the Trent, at Beeston, by Mr. Watson's keeper: it was a young bird in good plumage, measuring fifty-eight inches from tip to tip and twenty-eight inches in length. This is the first occurrence of this rare gull in Nottinghamshire.—*J. Whitaker, jun.*

Gulls off Valparaiso.—"The little gray-headed gulls are extremely numerous in this harbour, and extremely fearless. They swim about in large flocks all round the ship, and it is great fun watching them when a tit-bit of some kind or another floats astern. They dart on it like a swarm of bees, and squabble and fight and shriek most vigorously. Their cries, however, often attract the attention of a villainous thief, who on swift pinions comes gliding like a small fiend round the side of the ship, and is suddenly in their midst, and the poor little gulls fly away at once and leave this dark-coloured creature master of the situation and of the grub. Should a gull endeavour to fly off with a morsel he is pursued and swooped at until he gives it up. This bully is a skua of some sort, and very prettily marked

with a white patch on his shoulders. The little gulls live quite close to the landing-place, and may be seen all day flying about our people's heads looking out for food, or sitting on the gunwales of the boats. I have often seen a man sitting in the stern sheets of a boat and two or three gulls perched on the bows preening their feathers. No one tries to kill them here, hence their tameness."—*G. F. Mathew (in litt.) ; H.M.S. 'Repulse,' off Valparaiso, January 31, 1873.*

Crocus-blossoms cut off in their Prime.—Every gardener resident near London must have observed the blossoms of his yellow crocuses cut off obliquely, just at the base where the golden yellow is replaced by a white tube descending into the ground. I shall be greatly obliged to any reader who will inform me what is the cause of this annual calamity, or disease, or phenomenon, which occurs every year at this season, as if to frustrate the attempts of this favourite flower to make our gardens look gay, regardless of wind or weather.—*Edward Newman.*

Zoological Gardens.—The new strip of garden belonging to the Zoological Society, on the north side of the Regent's Canal, is now being put into order. The bridge over the canal is already finished, and the new lodge opposite Primrose Hill only wants the entrance-gates and turnstiles to make it complete. It is intended to open it to the public on Easter Monday.

Serialia growing on a Hippocampus.—I am not sufficiently familiar with these animals to know whether the fact I am about to relate is new. Yesterday I was at Mr. King's, the well-known dealer in aquariums and their denizens, at 190, Great Portland Street, when he invited my attention to a specimen of that singular fish, *Hippocampus ramulosus*, having an abundant growth of a small and delicate zoophyte on its head, neck, and the anterior part of its body: on comparing this little animal-plant with those in a collection made and named by Mr. Bean, of Scarborough, I found it correspond with a specimen which that distinguished naturalist had labelled *Serialia lendigera*. The fish and its parasite seemed both to be enjoying as much healthful vigour as falls to their respective allotments in life; I will say nothing about activity, for it is certain that a very small allowance of locomotive power has been vouchsafed to either, but I suppose that

"Even to know that they live and they breathe"

is worth all the active and muscular feats which seem to afford such pleasure to many members of the animal world. Nothing certainly can be more stolid than the conduct of sea-horses in general, unless it be that of the branched zoophytes, which are settled for life wherever they cast anchor in their extreme infancy.—*Edward Newman; March 15, 1873.*

Callionymus Lyra at St. Leonards.—About a week since, a beautiful specimen of the gemmeous dragonet was taken among the rocks on our shore. It was exceedingly beautiful in its colouring and marking; it was nine and a half inches in length. It is the second specimen that I have seen here. (See Yarrell's 'British Fishes,' 1st ed. vol. i. p. 261.)—*J. S. Bowerbank*; 2, *East Ascent, St. Leonards-on-Sea, Feb. 18, 1873.*

Callionymus Lyra in the Aquarium at Sydenham.—In the Aquarium at Sydenham, the gemmeous dragonet may be seen in perfection. Citizen Lacepède dwells in his delightful manner on the beauty of its name. "What pleasing images," says he, "what touching recollections, does it not recall! Celestial beauty charming our eyes, enchanting music touching our hearts; these two names happily associated restore, through memory, your sweet but irresistible power!" I am always so enthralled by the poetic writings of the Citizen, that I feel little inclination to criticise his meaning when he ascends to what is called "tall writing;" but I cannot pass over his eulogy of the name *Callionymus Lyra* without saying that I am unable to understand it. *Callionymus*, as he himself has explained, means simply "beautiful name," and does not apply to any distinguishing characteristic of the fish; and *Lyra* signifies a lyre, to which musical instrument the dorsal fin of the little fish is supposed to bear some resemblance. But I can forgive any little inconsistency in so delightful and reliable a teacher; and I use the word "reliable" advisedly, for, although I cannot always follow him in his fancies, Lacepède is particularly trustworthy in his facts. The older name of *Uranoscopus* is more classical and more appropriate, but implies a character, that of star-gazing, which is equally possessed by several other species; and, moreover, the name is applied to a Mediterranean fish (*Uranoscopus scaber*) which possesses the star-gazing accomplishment in a still more eminent degree. This star-gazing, however, is not acquired, and therefore scarcely an accomplishment; it is due to the position of the eyes, which are placed near together on the very crown of the head, so that they look directly upwards. In the dragonet they are protected, especially on the side where they approximate, by a raised rim; this rim seems to form portion of a cup in which the eye can revolve at the will of its owner, the whole apparatus reminding one of the free motion of a ball-and-socket-joint. The eyes have the power of turning, simultaneously or separately, like those of the chameleon, but they have no leathery covering with a median perforation like the eyes of that strange reptile. They are wondrous eyes, those of the dragonet, glowing like living sapphires, or emeralds, or amethysts, or like that glorious colour of a beetle's wing which we entomologists call "golden-green." Mr. Lloyd truthfully remarks in his 'Guide,' that their eyes give more the idea of actual fire than any other animal organism known; but, after all, no comparisons or epithets can possibly give any just idea of the objects themselves—their beauty exceeds

that of every other object with which I can compare them. The delicate but brilliant colouring of the male dragonet has obtained for it the name of "gemmeous," while the female is called the "sordid" dragonet, the term "dragonet" equally applying to both. It is rather singular that Lacepède, Yarrell, Couch, and other ichthyologists, should have thought proper in this and so many other instances to divorce man and wife, and to elevate the sexes to the rank of species. These fishes, possessing no swim-bladder, are not swimmers; they reside constantly at the bottom of the seas, either lying motionless on the mud or buried in the sand, all except the eyes; and when they move it, seems only by compulsion, or under the impulse of a sudden freak, and in a few seconds they settle down as they were before, often returning, after these little excursions, to the very spot from whence they started. In the intervals between these journeys the fish will suddenly raise its first dorsal fin, hold it straight upright for a second only, and then as suddenly depress it and render it invisible. This first dorsal is a strange organ almost as wonderful as the eyes; it is very narrow, and has but five rays, the first of which reaches to the tail, the second is scarcely more than half as long, and the others regularly decrease in length until the fifth, which is hardly a fifth of the length of the first. Another fact, and to myself a most interesting fact, with regard to these dragonets or skulpins, is that they appear entirely destitute of a gill-opening; or, more precisely speaking, of a gill-opening in the usual situation. The gill-cover seems to occupy its usual place, but its margin appears soldered all round, without leaving the smallest aperture for the passage of water for respiratory purposes: this, the usual function of the gill-opening, is delegated, at least so far as I understand the mechanism, to two nearly circular holes, somewhat resembling the blow-holes of Cetacea, and situated behind the head, on the dorsal surface of the neck, and near the margin of the gill-cover; they are closed by a sort of valvular process of the skin, and the respiration, which is evidently rhythmical, appears in some measure dependent on the will of the fish. When partially buried in the sand, these "blow-holes," as well as the eyes, remain exposed, and, thanks to the utter quiescence of the owner, may be examined at leisure. I should also observe that, although I have carefully examined the living fish under a lens of considerable power, I have as yet been unable to detect any trace of scales. This fish rejoices in a variety of names; on the coast of France it is "lavan-dièrre" and "doucet;" in Scotland, "gowdie;" in Cornwall, "sculpin." Tyson, who first described it as British, called it the "yellow gurnard;" Pennant, the "gemmeous dragonet," a name now generally adopted in this country. Its peculiarities are so striking that every naturalist has described it; but now, for the first time, we have the opportunity of seeing it alive.—*Edward Newman.*

Proceedings of the Entomological Society.

February 17, 1873.—Prof. WESTWOOD, President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—‘Illustrations of Diurnal Lepidoptera,’ part v. *Lycænidae*; presented by the Author, W. C. Hewitson, Esq. ‘Bidrag till Rännedom af Finlands Tryphonider’; and, ‘Materialier till en Ichneumonologia Fennica’; by the Author, F. W. Woldstedt.

Election of Members.

Alfred E. Hudd, Esq., of Redland Park, Bristol, was balloted for and elected an Ordinary Member; and Dr. Hermann Burmeister, of Buenos Ayres, was elected a Foreign Member of the Society.

Exhibitions, &c.

Mr. F. Bond exhibited a series of bred specimens of *Acronycta tridens* and *A. Psi*, with preserved larvæ of the two species. The specimens of *A. tridens* had all been reared on the common pear. He remarked that the dark specimens so often occurring in *A. Psi* were never repeated in *A. tridens*; and that the latter always exhibited a pinkish tint in fine fresh-bred specimens, which, however, was very evanescent.

Mr. Müller exhibited some cases of a species of *Psyche*, formed of twigs arranged spirally, and also the egg-case of a species of *Mantis*; these had been sent from Calcutta by Mr. James Rothney.

Professor Westwood exhibited two Dipterous larvæ preserved in spirits which were probably those of *Psila rosæ*. These had been discharged by a female in a clot of phlegm. He suggested when they were submitted to him that the person had probably been eating raw carrots, which, upon enquiry, turned out to have been the case. After they had been immersed in spirits for three or four days he took them out for examination, when he was surprised to find they were still alive. He also exhibited drawings of a dipterous larva (probably *Merodon clavipes*, *Fab.*) infesting some bulbs sent to him from the Continent. Also drawings of woody excrescences on stems of vine, which had probably been formed by a beetle of the genus *Otiorhynchus*. Mr. Müller remarked that Mr. Riley had recorded a similar habit in an American beetle allied to *Baridius*.

Professor Westwood further exhibited drawings of the root-fibres of a vine, dilated and constricted in a joint-like manner, which he thought was owing to former attacks of *Phylloxera*.

Mr. Briggs exhibited parallel series of the large and small forms of *Anaitis plagiata* taken by him in Tilgate Forest, in the month of June, stating that he had found only the larger form last year, in the same place in which he had found only the smaller form three years before. It was

commonly supposed that the smaller form was only a second brood, but this did not appear to be the case.

Papers read, &c.

‘On the Geodephagous Coleoptera of Japan, chiefly collected by Mr. George Lewis,’ by H. W. Bates, F.L.S., &c.

‘Contributions to Entomological Bibliography up to 1862, No. 1,’ by Albert Müller, F.L.S.

Mr. F. Smith read the following translation of some notes:—‘On the Salivary Organs of the Honey Bee,’ by C. Th. v. Siebold.

“At the annual agricultural meeting held in October, 1871, at Munich, a well-known apiarian, Herr Mehring, had exhibited a peculiar kind of honey, named by him ‘Kunst-Honig’ (artificial honey), which he had produced by feeding his bees exclusively with malt. This honey excited great interest; and the question was raised (and denied by many), whether this substance was real honey; and whether, consequently, the bee was able to change malt-sugar in its stomach into honey. The physiologico-chemical part of the inquiry into the production of the bee was taken up in Liebig’s laboratory by Dr. Von Schneider, who, unfortunately, was prevented from carrying the investigation to the end, but arrived at the conclusion that the hydrates of carbon (malt-sugar and malt-deatrin) contained in the malt are actually changed by the bee into honey-sugar; and that Mehring’s honey does certainly not differ from other honies, except in the absence of specific aromas which are imparted to them from the flowers on which the bees have been collecting. Practically, Herr Mehring’s discovery is of importance; inasmuch as the malt-food prepared by him contains not only all the ingredients necessary for the life of the bee, but also for the formation of honey; and therefore can be used with advantage in parts of the country where flowering plants are scarce. With regard to the wax, Dr. Von Schneider maintains that it is undoubtedly a secretion of the honey-bee, formed chiefly out of different kinds of sugar; but that the production of wax from sugar is not continued without the simultaneous addition of food containing nitrogen. After the fact had thus been established that honey and wax are not substances found ready made, and simply gathered by the bee; but productions which have undergone chemical changes through having come in contact with the secretions of the insect; Prof. Von Siebold directed his attention to the investigation of the secreting organs, a portion of the anatomy which, indeed, had previously been entirely neglected, but is now treated for the first time with regard to the special functions those organs appear to perform in the preparation of the products of the bee. Prof. Von Siebold distinguishes three entirely distinct and very complicated systems of salivary glands; two of which, a lower and an upper, are situated in the head, and the third in the anterior part of the thorax, the latter

having been erroneously regarded by Fischer as a lung. Each of them has separate excretory ducts, and is distinguished by a specifically different form and organization of the vesicles secreting the saliva. Each consists of a right and left glandular mass, with right and left excretory ducts.

“For the detailed account of their minute structure we must refer to the paper itself, and the plate accompanying it, but we must add that this extraordinary development of the salivary organs has been observed by Prof. Von Siebold in the workers only. The Queen possesses only a rudiment of the lower cephalic system in the form of the two orifices of its ducts, whilst the ducts themselves with the glands are absent; and the two other systems are much less developed than in the workers. In the drones not even the orifices of the lower cephalic system could be found. (*Bienenzeitung*, 1872. No. 23).”

Mr. Meldola, at the request of Mr. J. Jenner Weir, referred to the chemical composition of malt-sugar as compared with sugar in honey. It was stated that malt-sugar had the same composition as glucose; while honey, in addition to glucose, contained cane-sugar or saccharose. Mr. Weir remarked that it was an interesting fact that this chemical transformation of malt-sugar into a sugar containing a different percentage of carbon should take place in the economy of the honey-bee.

Mr. Smith read ‘Descriptions of Aculeate Hymenoptera of Japan, collected by Mr. Geo. Lewis, at Nagasaki and Hiogo. Of seventy-three species, forty-nine were previously unknown. He remarked that the distinctness of his *Apis nigrocincta* from *A. mellifica*, recently questioned by Dr. Gerstäcker, had been abundantly confirmed by the discovery of a queen of *A. nigrocincta*.

March 3rd, 1873.—Prof. WESTWOOD, President, in the Chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—‘Proceedings of the Royal Society,’ No. 141; presented by the Society.—‘*Buletino della Società Entomologica Italiana*,’ iv. Pt. 4; by the Society.—‘The Entomologist’s Monthly Magazine’ for March; by the Editors.—‘The Entomologist,’ and ‘The Zoologist for March;’ by the Editor.—‘*Horæ Societatis Entomologicæ Rossicæ*,’ t. viii. No. 4, t. ix. No. 2; by the Society.—‘*Stettiner Entomologische Zeitung*,’ xxxiv, Nos. 1—3; by the Entomological Society of Stettin.

Election of Members.

Noah Greening, Esq., of Warrington, a subscriber to the Society, and Edward Charles Buxton, Esq., of Daresbury Hall, Warrington, were balloted for and elected Ordinary Members of the Society.

Exhibitions, &c.

Mr. Howard Vaughan exhibited a box containing about two hundred specimens of Japanese Lepidoptera, collected near Yokohama by Mr. Henry Pryer; many of the species being apparently new. Some also were remarkable as bearing a close resemblance to British species. Mr. Moore noticed a strong Indian character in several of the insects.

The President remarked that Mr. Higgins had shown him a specimen of a *Cremastocheilus* from Japan, which was identical with a species that had been taken by Mr. Lord on the West coast of North America.

Mr. F. Smith exhibited some insects bearing a most remarkable resemblance to each other, although belonging to different orders. Thus, *Euglossa dimidiata* and another *Euglossa*, a Genus of Apidæ, bore a striking resemblance to two species of the Dipterous family Asilidæ, namely, *Dasyllis hæmorrhœa* and *Mallophora tibialis*, all from South America. Also, *Abispa splendida*, one of the Vespidæ, and an insect of the Dipterous genus *Lachites* (?), both from New Holland. Also, a bee of the genus *Megachile*, and one of the Asilidæ, *Mallophora calida*, *Wied.*, from South America. With regard to the two last-mentioned insects, Mr. Smith noticed that the *Asilus* not only resembled the bee in its general appearance, but that also it was furnished on the under side of the abdomen with a brush similar to the pollen-brush of *Megachile*; although it was not apparent for what purpose the insect required it.

The President remarked that when he was at Casa Brucciata, near Ancona, he observed several insects of the genus *Osmia* extracting the black pollen from poppies; and on the sandy shore he noticed the same insects collecting the sand on their ventral brushes. He therefore concluded that the brushes were used, not only for collecting the pollen, but also for carrying the grains of sand to their nests, which he observed them in the act of constructing on walls.

Mr. Champion exhibited specimens of *Bagöus brevis*, *Schaum.*; taken in this country by Dr. Power, although not hitherto observed in Britain.

Mr. Müller directed attention to an article in the last number of the 'Petites Nouvelles,' explaining a method of obtaining silk from cocoons which had been eaten through by the insects; and that the silk so obtained from the damaged cocoons was equal in quality to that obtained from the perfect cocoons, and did not require to be carded.

The President remarked that the library at the new Museum at Oxford had been very much infested, of late, with *Anthreni*; and he was very glad to observe that there was a paper by Dr. Emery in the 'Bulletino della Società Entomologica Italiana,' on a new method of preserving collections from their ravages.—*F. G.*

The Cuckoo. By Dr. A. E. BREHM.*

DURING the pairing time the cuckoo acts like a headstrong, passionate idiot. How angry sounds his cry, and what a rage he gets into when another of the same species dares to invade his territory. He will come blindly to the call of the sportsman, who understands how to imitate his note. Sitting on a branch, with raised tail and ruffled head-feathers, he cries "cuckoo" as a note of defiance to the world at large. While flying he will often glide slowly in front of his mate, and tell his passion with a low "cwawawa," to which the latter answers, "kwikwikwik," &c., with great rapidity, a cry savouring more of laughter, or a chuckle, than a favourable response to his affectionate invitation. When both are at the height of their courtship the one cries "cuckookook cuckookook," while the other laughs and chuckles. After the breeding season is over both sexes are silent. It is possible that, as a rule, the cuckoo is content with one mate; yet it is more likely that neither sex is particular in the matter of conjugal fidelity: it seems much more likely that each male should court all the females alike, and *vice versa*, else why this unbounded jealousy?

At the commencement of the pairing time the female begins to hunt diligently amongst the bushes for some suitable nest in which to lay her egg, for this traitor to other birds, impatient and restless, does not care to take upon herself the trouble of rearing her own brood, but leaves them entirely to the care of others. The little warblers must exercise all their activity to keep such an insatiable bird as a young cuckoo supplied with food, while the real parents are enjoying themselves, flying hither and thither to their heart's content, laying other eggs, and abandoning them without a pang of remorse. As we have said before, the hen cuckoo, before laying, searches ever crack, crevice, or bush, until she has found a nest suited to her requirements. She then lays her egg; if necessary, first on the ground, whence she picks it up with her beak, and places in the home she has selected for it. The foster-parents generally chosen by the cuckoo are generally picked out from amongst some fifty different species of insectivorous birds: those

* Extracted from 'Bird-Life,' Part VII., a translation of which is now in course publication by Mr. Van Voorst.

principally selected are whitethroats, wrens, wagtails, tree pipits, redbreasts, hedgesparrows, willow wrens, sedge warblers, meadow pipits, whinchats, and even the smallest of our European birds—the goldcrest! The egg of the cuckoo is small, and always marked like that of the foster-parent selected. Some people assert that the cuckoo which has been brought up by a water wagtail always lays eggs similar to those of that bird. Others, again, believe that the female cuckoo first seeks out a nest wherein to deposit her egg, and that when the right one is found, she looks earnestly at the eggs, with a view of being thereby so affected in her state of pregnancy that she may by this means cause her own egg to assume markings similar to those already in the nest. Neither of these two suppositions has, as yet, been proved to be correct. Naumann believes that he has discovered that one female cuckoo will deposit eggs in the nests of different species, which, if true, quite upsets one of the above suppositions. Sometimes two cuckoo's eggs are found in one nest; these are probably laid by two different birds. Be this, however, as it may, there is no doubt on one point, and that is that the little foundling is deposited in the nest of the foster-parents by its unnatural mother in a most cunning and surreptitious manner. Our readers will labour under a great mistake if they suppose for a moment that the intruder is in any way regarded as a blessing by its foster-parents; on the contrary, they exhibit great animosity if they chance to detect the cuckoo in her insidious proceeding; many of those little birds of whose nests the cuckoo avails herself mob her with every demonstration of hostility, as though she were a bird of prey. Fully aware of this, the cuckoo always selects a nest where the entire complement of eggs have not been laid, so that she can take advantage of the temporary absence of the parent birds. She glides to and from the nest with the caution of a thief; rejoices over her success, should she be able to accomplish her end without being observed by the birds she has so cruelly wronged. In the act of depositing her egg the cuckoo often breaks one of the others, perhaps to suck it, but probably the egg is more often accidentally broken. Usually the rightful owners of the nest lay other eggs after the introduction of the stranger, and then commences the work of incubation. On very rare occasions they will turn the cuckoo's egg out of the nest, though usually they do not entertain the slightest suspicion on the subject, and pursue the business of sitting without further ado.

Up to the present time no one has been able to give any explanation of the motive for this singular habit of the cuckoo, of imposing the care of her young on strangers. It has been supposed that the cuckoo lays, at the most, eight eggs every spring, and on account of their being deposited at great intervals she would be unable to hatch and rear them herself. This induces another question: Why does she lay her eggs at such long intervals? This also remains unexplained! Every theory on these points is replete with interest, at least in our eyes. The small size of the cuckoo's eggs is very remarkable. This large bird lays an egg which rarely exceeds in size that of the house sparrow. Besides which, these eggs vary as much in size and shape as in colouring, though amid all the variations of colour the experienced eye can readily distinguish them, but it is difficult to express the difference in words. The shell is always thin, fragile, and but slightly shining. The first eggs are laid in May, the last often as late as July, so that they may be deposited amongst the first or the second brood of other birds.

There are but very few birds which, like the common cuckoo, leave their progeny to the care of strangers; and amongst our European Avifauna only one other species, the great spotted cuckoo (*Coccyzus glandarius*). This bird is an inhabitant of Spain, and has been known to occur also in Germany: it does not, however, deposit its eggs in the nests of small birds, but has been observed in Africa to avail itself of that of the hooded crow, and in Spain of that of the magpie. The eggs of this species are much larger than those of our common cuckoo, and are always similarly marked to those of the birds to whose care they are entrusted. Amongst foreign birds, besides the true cuckoos, there are several species which, so to speak, put their young "out to nurse."

The foster-parents of the common cuckoo behave nobly towards their charge, bestowing on the intruder a care and affection equal to that evinced for their own young, and rearing it with the greatest care and self-sacrifice. Not only is the appetite of the foundling insatiable, taxing the efforts of its foster-parents to the utmost, but it grows so fast as soon to occupy the greater portion of the nest, thus outstripping its foster-brothers and sisters in size; it soon disposes of these by shifting and fidgeting, until it gets them one after another on its broad shoulders, and then heaving them bodily out of the nest, finally remains in sole possession: then

it settles itself at ease, opening its immense, yellow mouth wider than ever, and clamouring more eagerly even than before for food. Its hunger is unlimited, and it swallows the food brought by its foster-parents with the utmost avidity. "The more it wants," says my father, "the harder the little songsters labour to satisfy it: they fly backwards and forwards, taking no rest until their voracious foster-child has been satisfied. It is quite touching to watch the anxiety and care which they display. The little wren, and still more strange, the diminutive goldcrest, in their care for the cuckoo under their charge, are perfectly oblivious of themselves and their own requirings. They scarcely allow themselves time to satisfy their own hunger: the feeding of their foster-child is their first and principal object." In olden times it was asserted that the young cuckoo devoured its foster-parents; this is, however, manifestly untrue, though we may easily understand that observers, on seeing the young bird's immense and ever-open mouth, might, without any great stretch of the imagination, have arrived at that conclusion. Others have given a finishing touch to the romance by saying that the young cuckoo did not devour its foster-parents until it had no further need for them! This has led to the custom of holding up the cuckoo as typical of those ungrateful children, who, when their parents have nothing more to give, neglect, despise, and ill-use them.

Throughout Nature there is no more striking exemplification of the *storgé*, or maternal solicitude of birds for their young, than this exhibited by the foster-parents of the cuckoo for their adopted child. These birds might well be regarded as patterns worthy of imitation by our human step and foster-parents! The stranger, who has turned the legitimate children out of their home, is tended by the now childless parents with as much tenderness and love as if it was their own. If one only approaches the uncouth foundling, which is the produce of a strange egg palmed upon their credulity, they show the most painful anxiety on its behalf, and seek by all means in their power to preserve it from danger and defend it. Fearlessly they flutter round a person coming near the nest, crying pitifully, and apparently totally oblivious of their own safety, when intent on protecting their charge. The foster-child understands their warning notes, for it instantly becomes silent, though just before it has been calling out "hip, hip," in hungry tones, to the best of its ability. This extraordinary care is continued by the foster-

parents after the young cuckoo has left the nest, and lasts until the bird can feed itself; very rarely, indeed, is it abandoned by its foster-parents. "In June, 1812," says my father, "a wren's nest was found on the manor of Frohlichen-wiederkunft, which contained two young wrens and a cuckoo,—quite an exceptional case; the dome of the nest had preserved the young wrens from being ejected by the cuckoo. A friend of mine took the cuckoo when it was almost ready to fly, and, as is often done by bird-fanciers, placed it in a cage, intending to bring it to me as soon as it was fledged. The foster-parents in this case, however, abandoned the foundling, and in two days it was found starved to death; the wrens having taken up their abode elsewhere, with their own nestlings, had not been able to feed both their own young and the cuckoo." Such a case is, however, very unusual indeed. As a rule the young cuckoo is cared for by its foster-parents until able to procure food itself. After this it frequents the neighbourhood of its birth-place until August, when it prepares for its migratory flight.

Cuckows' Eggs.

[The following is a *verbatim* reprint of Professor Newton's article intitled as above: it appeared at p. 74 of the third number of 'Nature' (dated November 18, 1869): allusion having been made to it by Mr. Smith in the April number of the 'Zoologist' (SS. 3478) I have thought it best to lay it before my ornithological readers.—*Edward Newnam.*]

SCARCELY any bird has so much occupied the attention, not merely of naturalists, but of people generally, as the common cuckoo of Europe, and (we might almost add, consequently) scarcely any bird has had so many idle tales connected with it. Setting aside several of its habits wherein it differs from the common run of birds, its strange, and, according to the experience of most persons, its singular mode of entrusting its offspring to foster-parents, is enough to account for much of the interest which has been so long felt in its history. Within the last twenty years a theory (which is, as I shall presently show, by no means a new one) with respect to an important fact in its economy, has attracted a good deal of attention, first in Germany, and latterly in England; and as this theory seems to be especially open to misconception,

and in some quarters to have been entirely misunderstood, I shall endeavour to give an account of it in a manner more distinct than has yet (I think) been done; and to show that there is no good ground for believing it to be irrational, as some have supposed, and for scouting it as something beneath contempt.

It has long been notorious to oologists that the eggs of the cuckow are subject to very great variety in colour, and that a large number of birds laying eggs of very different colours enjoy the doubtful advantage of acting as foster-parents to the young cuckow. Now the theory to which I refer is that "the egg of the cuckow is approximately coloured and marked like those of the bird in whose nest it is deposited, that it may be the less easily recognised by foster-parents as a substituted one."

This theory is old enough, for it was announced and criticised nearly a hundred years ago by Salerne,* who, after mentioning that he had seen two stonechats' nests, each containing eggs of that bird, as well as a cuckow's (which was as blue as the others, but twice [?] as large), goes on to say that he was assured by an inhabitant of Sologne (a district in France to the south of Orleans), that the cuckow's egg is always blue; and then comes this remarkable statement:—"As to the^t assertion of another Solognot who says that the hen cuckow lays its eggs precisely of the same colour as those in the nest of which she makes use, it is an incomprehensible thing." Many of my readers will, I doubt not, be at once inclined to agree with Salerne.

Little attention seems to have been paid to this passage by succeeding naturalists;† but in 1853 the same theory was prominently and (I believe) independently brought forward by Dr. Baldamus, then editor of 'Naumannia,' a German ornithological magazine, now defunct; so far as I know, however, it was not until April, 1865, that an article in the English ornithological journal, the 'Ibis,' by Mr. Dawson Rowley, gave anything like an idea of it to the public of this country. Some months later (14th September) Mr. A. C. Smith introduced the subject to the Wiltshire Archæological and

* L'histoire naturelle, éclaircie dans une de ses parties principales, l'ornithologie, &c. Paris; 1767, p. 42.

† Montbeillard (Hist. Nat. des Ois. vi. p. 309) mentions it, but I am not aware of any one else who has done so, until M. Vian in the 'Revue et Magasin de Zoologie' for 1865 (p. 40), referred to it, and from this reference I became acquainted with it.

Natural History Society, and the paper he then read, having been since printed in the 'Wiltshire Magazine' (vol. ix. p. 57), and elsewhere, has, with Mr. Rowley's article, made the theory very generally known. Mr. Smith also published, subsequently, in the 'Zoologist' for 1868, a translation of Dr. Baldamus's elaborate essay; but this translation being unaccompanied by the coloured plate which illustrated the original, unfortunately fails to do justice to the Doctor's theory, for without seeing the specimens on which this is founded, or good figures of them, the evidence in its favour can scarcely be appreciated fully.

Dr. Baldamus's theory had been some time known to me, when in 1861 I had the pleasure of being shown by him his collection of cuckow's eggs, and I can declare that his published figures represent the specimens (sixteen in number) from which they are drawn, as faithfully as figures of eggs usually do, and that an inspection of the series convinced me that the belief he entertained was not groundless. All the eggs in question, some departing very widely from what I had been used to regard as the normal colouring, bore an unmistakable resemblance to those of the birds in the nests of which they were asserted (in most cases, I was assured, on very good authority) to have been found; while in some cases there was just enough difference between them and those they "mimicked," to show that it was far more unlikely that they should have been extraordinary varieties of the eggs of the species in question, than eggs of the cuckow.

Dr. Baldamus's allegation therefore seemed to me to be in part proved. If the history of the eggs before me could be trusted—and I had no reason to doubt it—the fact of the likeness was in many respects self-evident, in others certainly not so striking, and in some perhaps questionable. In further corroboration of the theory also, there were the similar instances cited with much assiduity from foreign sources by Dr. Baldamus in his essay,* and one, apparently not known to him, but given by Mr. Blyth in Sir William Jardine's 'Contributions to Ornithology' for 1850 (p. 69 *bis*, pl. 52). Another and very remarkable case had also come to my own knowledge. In the autumn of 1857 I had received from Mr. Tristram all the eggs collected by him in Algeria during the preceding season. When

* I do not here enumerate them; they will be found in 'Naumannia' for 1851, p. 317, note. The plate which illustrates the paper is in the volume of the same magazine for the following year.

they were unpacked, it appeared that there were two more specimens of the egg of a large North-African cuckow (*Oxylophus glandarius*) than I had been led by him to expect. On examination, I found that the first two eggs of this species which had been obtained by him so much resembled eggs of the magpie of the country (*Pica mauritanica*), in the nests of which they had been found, that, skilful oologist as he was, they had passed, even to his practised though unsuspecting eye, as those of the latter bird. Had I known then of Salerne's words, I should have exclaimed with him, "c'est une chose incompréhensible!"

Having said thus much, and believing as I do the Doctor to be partly justified in the carefully-worded enunciation of what he calls a "Law of Nature," I must now declare that it is only "approximately" and by no means *universally* true that the cuckow's egg is coloured like those of the victims of her imposition. Increase as we may, by renewed observations, the number of cases which bear in favour of his theory, yet, as almost every bird's-nesting boy knows, the instances in which we cannot, even by dint of straining our fancy, see resemblances where none exist, are still so numerous as to preclude me from believing in the generality of the practice imputed to the cuckow. In proof of this I have only to mention the many eggs of that bird which are yearly found in nests of the hedge-sparrow in this country, without ever bearing the faintest similarity to its well-known green-blue eggs. One may grant that an ordinary English cuckow's egg will pass well enough, in the eyes of the dupe, for that of a titlark, a pied wagtail, or a reed-wren, which, according to my experience, are the most common foster-parents of the cuckow in this country; and indeed one may say, perhaps, that such an egg is a compromise between the three, or a resultant, perhaps, of three opposing forces; but any likeness between the hedge-sparrow's egg and the cuckow's, so often found alongside of it, or in its place, is not to be traced by the most fertile imagination. We must keep therefore strictly to the letter of the law laid down by Dr. Baldamus, and the practice imputed to the cuckow is not universally but only "approximately" followed.

Now, is it possible to give a satisfactory explanation of the process by which the facts alleged are produced? Dr. Baldamus assigns none. He lays down a number of aphorisms, most of which are very interesting, and, I believe, true; but they do not

touch the question. A good many people who have only read hastily, and still more those who have to all appearance only read at second or third-hand what has been written on the subject, seem to imagine that the Doctor has wished to assert that the cuckow can voluntarily influence the colour of her egg, so as to assimilate it to those already in the nest in which she is about to deposit it.* Dr. Baldamus, indeed, mentions such a supposition, but expressly says that he rejects it, and herein I think that nearly every physiologist will agree with him.

It will be admitted, I think, that Dr. Baldamus's inference as to the object of the practice being that the cuckow's egg should be "less easily recognised by the foster-parents as a substituted one," is likely to be true. This being the case, only one explanation of the process can to my mind be offered. Every person who has studied the habits of animals with sufficient attention will be conversant with the tendency which certain of those habits have to become hereditary. It is, I am sure, no violent hypothesis to suppose that there is a very reasonable probability of each cuckow most commonly placing her eggs in the nests of the same species of bird, and of this habit being transmitted to her posterity. Without attributing any wonderful sagacity to the cuckow, it does seem likely that the bird which once successfully deposited her eggs in a reed-wren's or a titlark's nest should again seek for another reed-wren's or another titlark's nest (as the case may be), when she had an egg to dispose of, and that she should continue her practice from one season to another. We know that year after year the same migratory bird will return to the same locality, and build its nest in almost the same spot. Though the cuckow be somewhat of a vagrant, there is no improbability of her being subject to thus much regularity of habit, and, indeed, such has been asserted as an observed fact. If then this be so, there is every probability of her offspring inheriting the same habit, and the daughter of a cuckow which always placed her egg in a reed-wren's or titlark's nest doing the like.

Further, I am in a position to maintain positively that there is a family likeness between the eggs laid by the same bird, even at an interval of many years. I know of more than one case in which a

* Thus Mr. Cecil Smith (not to be confounded with Mr. A. C. Smith, before mentioned) in a work published within the last few weeks, falls into this mistake ("Birds of Somersetshire," p. 265), after having stigmatised the Doctor's theory as "wild," which he well might if it had been as it is represented.

particular golden eagle has gone on season after season laying eggs that could be at once distinguished by a practised eye from the eggs of almost any other golden eagle; and I know of one case in which the presumed daughter of a particular golden eagle, remarkable for having produced eggs of very great beauty, has in two successive years laid eggs which unmistakably resembled those of her reputed mother in the brilliant character of their colouring.

Hence I am not afraid of hazarding the supposition, that the habit of laying a particular style of egg is likely to become hereditary in the cuckow; just as I have previously maintained that the habit of depositing that egg in the nest of a particular kind of bird is also likely to become hereditary.

Now it will be seen that it requires but an application to this case of the principle of "Natural Selection" or "Survival of the Fittest" to show that if my argument be sound, nothing can be more likely than that, in the course of time, that principle would operate so as to produce the facts asserted by the anonymous Solognot of a hundred years ago, and by Dr. Baldamus and others since. The particular *gens* of cuckow which inherited and transmitted the habit of laying in the nest of any particular species of bird, eggs having more or less resemblance to the eggs of that species, would prosper most in those members of the *gens* where the likeness was strongest, and the other members would (*cæteris paribus*) in time be eliminated. It is not to be supposed that all species, or even all individuals of a species, are duped with equal ease. The operation of this kind of "Natural Selection" would be most marked in those cases where the species are not easily duped, that is, in those cases which occur the least frequently. Here it is that we find it, for it has been shown that eggs of the cuckow, deposited in the nests of the red-backed shrike, of the bunting-lark, and of that bird which for some reason best known to the donor bears the English name of "Melodious Willow-warbler," approximate in their colouring to the eggs of those species—species in whose nests the cuckow rarely (in comparison with others) deposits her eggs. Of species which would appear to be more easily duped, or duped in some other manner—the species in whose nests cuckow's eggs are more commonly found, I may have something to say in another paper.

ALFRED NEWTON.

Further Remarks on the Colouring of Cuckoos' Eggs.

By the Rev. A. C. SMITH, M.A.

I THINK I may venture to say that in the opinion of most ornithologists (1) the question of the colouring of cuckoos' eggs, according to the theory of Dr. Baldamus, is an *interesting* one; and (2) whether it shall eventually be proved to be founded on fact, or unfounded, at all events it *deserves investigation*. Such being at all events my own opinion, I thought to contribute a harmless, if not a useful, article on the subject, by sending to the 'Zoologist' for March last [S. S. 3433] a translation of what I considered a very valuable paper, which was published in the 'Journal für Ornithologie'; but as I never dreamed of giving offence to any body by so doing, I was considerably surprised at the indignation which my unfortunate paper seems to have excited in Mr. Hewitson's mind, and the vehemence with which he has attacked me. Moreover, I cannot but think that in this matter I have been somewhat hardly treated by that gentleman: but letting that pass, I desire to reply to him as concisely as his many charges against me will allow.

Mr. Hewitson is undoubtedly a keen-eyed observer, for he has discovered in my paper the following extraordinary points, all of which had completely escaped the notice of the author:—(1) that my paper was "a personal attack upon him;" (2) that I had styled him "a would-be ornithologist;" (3) that I "seem to think I monopolise the love of truth;" (4) that I am "angry with English ornithologists, because they have not been able to find evidence in support of Dr. Baldamus' theory;" and in addition to these heavy charges he declares, (5) that it was through my misleading that he had misunderstood Dr. Baldamus' theory from the first; and implies (6) that I, as a comparative novice, have no right to hold an opinion at variance with so old an ornithologist as himself; (7) that the long series of cuckoos' eggs so carefully examined and tabulated by the German naturalists were not laid by the cuckoo at all; and (8) that having commended the painstaking of those indefatigable observers, I ought to advocate the cause of some other gentleman, because he is a German, who seems to have mistaken a nightjar for a cuckoo! I will take these accusations *seriatim*, and briefly reply to them.

(1.) That my paper was not a personal attack upon any body is clear, inasmuch as I never alluded from first to last to any single individual, though I did protest against the ridicule with which Dr. Baldamus' theory was received in certain quarters, which I took the liberty of showing was neither a respectful, a philosophical, nor a convincing way of meeting a theory, however it might at first sight appear to some to be mistaken. I can only add to this, that if Mr. Hewitson chooses to put on the cap, and finds it fit, and likes to wear it, he is a volunteer champion in the anti-Baldamine ranks, and may fairly single me out for attack, and run a tilt at me; but then it is not fair to charge me as his aggressor. (2.) It is a graver matter when Mr. Hewitson misquotes my words, in making me fasten on him the title of "a would-be ornithologist," inasmuch as neither to him individually, nor to those collectively who tried to pooh-pooh Dr. Baldamus, did I apply any such words, though I did speak of "some would-be *leaders in the ornithological world*," which I maintain is a totally different matter; and for the accuracy of this I beg to refer the readers of the 'Zoologist' to the passage (S. S. 3434). (3.) It is also a somewhat serious charge which Mr. Hewitson brings against me that I "seem to think I monopolise the love of truth." Had I written a word which savoured of such presumption, I would, indeed, retract it, and most humbly apologize; but after carefully examining my paper from beginning to end, I cannot find a single sentence which would give a colour to such an accusation, and I know not to what he alludes. Moreover, it is somewhat strange that at the end of my article, I happen to express the exact contrary, when inviting Mr. Rowley, who had opposed the theory of Dr. Baldamus, to give his present opinion on the subject, I remarked that "both he and I are only desirous to elicit the truth of the matter." Neither can I discover (4) on what grounds I am told that I am "*angry* with English ornithologists, because they have not been able to find evidence in support of Dr. Baldamus' theory." Most assuredly I was not aware that I had shown any anger or ill-temper in the matter; and I am equally certain that I have never written anything which betokened annoyance, because I have never felt any, either with those who have expressed disagreement with the theory in question, or *a fortiori* with those who have held aloof from the subject. Indeed, if I know myself at all, it is not in accordance with my natural temperament to entertain the slightest shade of petulance against those who

take the opposite view in such discussions as this. (5.) As to the charge of misleading Mr. Hewitson in the way that gentleman describes, and so of perverting the truth, I confidently leave the verdict on this to unprejudiced readers. When Mr. Hewitson quoted my words in the first instance, they were, I can assure him, the words of the German Doctor himself; but it was not quite fair in Mr. Hewitson to stop short at that sentence, and jump to the conclusion that the cuckoo (according to Baldamus) "could lay eggs of what colour she pleased." In common fairness he should have read farther on, when he would have found the Doctor saying, "that the same cuckoo lays all her eggs of one colour and markings only, and so is limited to the nests of but one species." I need not, surely, remark how mischievous and how unfair it is to quote a single sentence, and then ignore what follows; more especially in a somewhat intricate question which requires exact and full development, before the real view of its author is comprehended. (6.) Even if Mr. Hewitson was, as he says, "an ornithologist probably before I was *hatched* (!) I do not know that I ought to be precluded thereby from holding my own opinion, notwithstanding his *ipse dixit*. Then, Mr. Hewitson must certainly be a very old bird indeed, for I am a chicken which has seen half a century go by, and so far as age was concerned I should have thought myself now (if ever) qualified to form an opinion. However, I most sincerely hope that Mr. Hewitson has many years yet before him for ornithological work; for that he has done good service in the cause, with his beautiful book on the 'Eggs of British Birds' before me, I am one of the first to allow; only I think that prejudice in favour of old opinions, and impatience of discoveries hitherto unforeseen in one's favorite pursuits, may perchance attend advancing years. Hence, too, perhaps the general distrust and dislike of foreigners which Mr. Hewitson evidently entertains, and which were too commonly felt by Englishmen in bygone years, but which for the most part have now happily given place to less prejudiced and more liberal sentiments. (7.) To distrust the series of cuckoos' eggs which the German ornithologists have collected with so much patience and care, and to disbelieve their authenticity, is of course a very easy way of shelving the argument; but I do not think this view will commend itself to many who have marked with what admirable perseverance, and with what infinite painstaking, those large collections were formed. Mr.

Hewitson, at all events, should be the last to originate such a charge, for what indignation would he feel—and as I maintain, *justly* feel—did any one insinuate for a moment that some of the rarer eggs figured in his valuable book, alluded to above, were not genuine, but spurious? (8.) It seems almost unnecessary to answer the last paragraph of Mr. Hewitson's paper. Does he seriously maintain that it is my duty, because I admire the genius and the diligence of certain German ornithologists, to uphold the opinions of *all other Germans*, whatsoever and wheresoever they may be? Does he himself feel called upon in like case, and with regard to the wild and random assertions, sometimes rife even among British naturalists, to endorse them? But this is childish: it is not argument; it is not logical; neither is it philosophical or instructive. I will only repeat that I deprecate most heartily such a way of getting rid of a question, which may not commend itself to the judgment of the individual; and I would loudly call for a fair field and fair play for this or any other kindred question, be it broached by an Englishman or a foreigner.

I have thought it right to vindicate myself from the charges brought against me; but I turn now with considerable satisfaction from these miserable personalities, from which Natural History discussions should be wholly exempt; and I proceed to reply to some of the more telling arguments which have been, fairly enough, adduced against the theory of Baldamus. First, however, I have to thank Mr. Rowley for so readily acceding to my request in giving his opinion of the last list (*viz.* that of Dr. Rey) which I have published: and most certainly do I agree with him that this matter is as yet *sub judice*, and that hitherto we have by no means arrived at the bottom of it. I acknowledge that Mr. Rowley's first argument is very powerful, if it can be certainly proved; *viz.* that there is no adequate cause for such assimilation in colour of the cuckoo's egg to those of the foster-parent. But the question which starts before my mind here is, whether it is established as a fact that birds, as a rule, *will* sit upon eggs so readily, or whether it is not a fact that many birds will forsake the nest, if they find that their eggs have been tampered with? It is long since I went birds'-nesting, but my recollections of past experiences certainly tend to the conclusion that most birds do not like their eggs meddled with at all. I perfectly remember that when a boy at Eton, where some hundreds

of prying eyes left the wretched birds which frequented that part of the country, but small chance of rearing any young, I used to start forth in the early summer morning, as soon as the doors of our house were unlocked, and hurrying with my pocket full of small pebbles to the banks of the Thames, where I had previously found reed-wrens' nests; and there no sooner was an egg descried, but it was purloined, and a small stone deposited in its place; and in the case of that species the exchange seemed quite satisfactory, and the unsuspecting birds laid on as if their eggs had never been touched. But this was the only species which I could persuade to be so accommodating: it was not so with the hedgesparrow, or robin, or yellow-hammer, nor indeed with any other species, so far as I can remember;* but I should like to know what the experience of others may be on this point, because if it can be proved that ordinarily the sitting bird will accept an intended egg of any colour, then I confess such an argument would be to my mind exceedingly strong against Dr. Baldamus' theory, and it would require very positive testimony in its favour before I could accept it.

With regard to Mr. Rowley's inquiry for a cuckoo's egg of a blue colour, it seems to me a very legitimate demand, if the theory in question be correct, that such blue cuckoos' eggs should be forthcoming. Mr. Rowley does not evidently consider the blue eggs asserted to be cuckoos' eggs by Dr. Baldamus (Zool. S. S. 1151, Nos. 2 and 15; see also p. 1154, No. 15) and Dr. Rey, (Zool. S. S. 3435—3437) to be positively proved to be authentic; nor does my friend Professor Newton seem quite satisfied on the point, though he adduces the testimony of Salerne, who a hundred years ago had seen "two stonechats' nests, each containing eggs of that bird, as well as a cuckoo's, which was as blue as the others," and quotes the dictum of the Solognat "that the cuckoo's egg is always blue" ('Nature,' vol. i. p. 74); and though he tells us he had the pleasure in 1861 of being shown by Dr. Baldamus his collection of cuckoos' eggs, of which he says, that his "published figures represent the specimens from which they are drawn as faithfully as figures of eggs usually do," and amongst which I beg to remind him was one resembling the blue egg of the redstart (Zool.

* This, my experience of stones substituted for eggs, successful with the reed-wren, but unsuccessful with other birds, I communicated to the 'Zoologist' twenty years ago (First Series, p. 4095).

S. S. 1166, No. 4). Still the Professor evidently requires more information about these blue eggs, and in a letter to the 'Field' March 15, 1873), reprinted in the 'Zoologist' (S. S. 3473), declares that "so far as he is aware, no one has ever found in the nest of a hedgesparrow a cuckoo's egg which is similar to that of the hedgesparrow." Now I think myself extremely fortunate that I happen to have just the evidence which is wanting on this point, and what I cannot but consider unanswerable evidence; for a short time back a gentleman of unimpeachable veracity told me that he had a very interesting fact about cuckoos' eggs to communicate to me, which bore out the theory I had been putting forward, for that he had himself discovered in the nest of a hedgesparrow two cuckoos' eggs of a blue colour, and one of these was a very pronounced blue; and that he had watched this nest till the eggs were hatched, when he himself saw two young cuckoos therein. This information was so valuable, as my informant was a gentleman I could trust, that I begged him to write down the facts of which he was an eye-witness, and all the particulars he could recollect, which he subsequently did, and now I proceed to quote the words of his letter which I have before me. "Dear Sir,—I have found the cuckoo's egg several times in the hedgesparrow's nest, and once two eggs, but varying from each other both in colour and size. Having a doubt whether both belonged to one cuckoo, or even one of them to a cuckoo at all, it being of almost as intense a blue as the hedgesparrow's, but very little larger (the other being much lighter in colour, and freckled at its larger end), I determined to watch the nest, which contained four hedgesparrow's eggs, besides the cuckoo's two eggs above-mentioned. Of the hedgesparrow's eggs, one was somehow lost; the rest were all hatched, but one of the young cuckoos died after two or three days' existence (I believe from being too freely handled and exposed): the other managed, in about a week's time, to get rid of its companions, and when fledged was himself made a prisoner, lived some months in a cage, and then moped and died. I have also found the cuckoo's egg in the wag-tail's nest (though how it got there I never could tell), in the yellowhammer and chaffinches' nests, and I have known it found in the thrush's nest, and in all of these I have been remarkably struck with the similarity of colour with the eggs of the different birds in whose nests they were: indeed, for several years I had the egg from the thrush's nest, which could scarcely be recognized from

the egg of the thrush in size, in colour, or in markings. I will add only one other fact, that I have found a cuckoo's egg in a hedge-sparrow's nest two years in the same hedge, which induces me to think it probable that both eggs may have belonged to the same bird. As the facts above related are strictly within my own knowledge, you may make what use of them you please.—J. E. BRINE (Abbey House, Shaftesbury)."

I do not think I can add anything to that clear statement, every word of which I most implicitly believe to be true: neither will I trespass any longer on the pages of the 'Zoologist,' at all events for the present; though I may, if I be not reckoned tedious, return to the question another day.

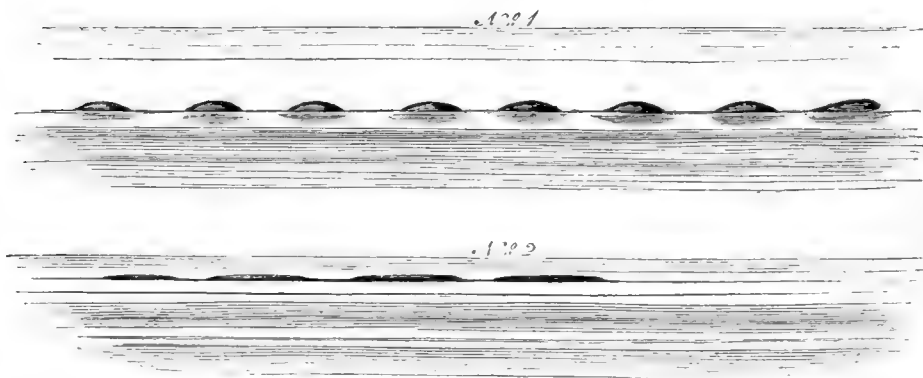
ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
April 5, 1873.

Appearance of an Animal, believed to be that which is called the Norwegian Sea Serpent, on the Western Coast of Scotland, in August, 1872. By the Rev. JOHN MACRAE, Minister of Glenelg, Invernesshire, and the Rev. DAVID TWOPENY, Vicar of Stockbury, Kent.

ON the 20th of August, 1872, we started from Glenelg in a small cutter, the 'Leda,' for an excursion to Lochourn. Our party consisted, besides ourselves, of two ladies, F. and K., a gentleman, G. B., and a Highland lad. Our course lay down the Sound of Sleat, which on that side divides the Isle of Skye from the mainland, the average breadth of the channel in that part being two miles. It was calm and sunshiny, not a breath of air, and the sea perfectly smooth. As we were getting the cutter along with oars we perceived a dark mass about two hundred yards astern of us, to the north. While we were looking at it with our glasses (we had three on board) another similar black lump rose to the left of the first, leaving an interval between; then another and another followed, all in regular order. We did not doubt its being one living creature: it moved slowly across our wake, and disappeared. Presently the first mass, which was evidently the head, reappeared, and was followed by the rising of the other black lumps, as before. Sometimes three appeared, sometimes four, five, or six, and then sank again. When they rose, the head appeared first, if it had

been down, and the lumps rose after it in regular order, beginning always with that next the head, and rising gently; but when they sank they sank all together rather abruptly, sometimes leaving the head visible. It gave the impression of a creature crooking up its back to sun itself. There was no appearance of undulation: when the lumps sank, other lumps did not rise in the intervals between



them. The greatest number we counted was seven, making eight with the head, as shown in the sketch No. 1. The parts were separated from each other by intervals of about their own length, the head being rather smaller and flatter than the rest, and the nose being very slightly visible above the water; but we did not see the head raised above the surface either this or the next day, nor could we see the eye. We had no means of measuring the length with any accuracy; but taking the distance from the centre of one lump to the centre of the next to be six feet, and it could scarcely be less, the whole length of the portion visible, including the intervals submerged, would be forty-five feet.

Presently, as we were watching the creature, it began to approach us rapidly, causing a great agitation in the sea. Nearly the whole of the body, if not all of it, had now disappeared, and the head advanced at a great rate in the midst of a shower of fine spray, which was evidently raised in some way by the quick movement of the animal,—it did not appear how,—and not by spouting. F. was alarmed and retreated to the cabin, crying out that the creature was coming down upon us. When within about a hundred yards of us it sank and moved away in the direction of Skye, just under the surface of the water, for we could trace its course by the waves it raised on the still sea to the distance of a mile or more.

After this it continued at intervals to show itself, careering about at a distance, as long as we were in that part of the Sound, the head and a small part only of the body being visible on the surface; but we did not again on that day see it so near nor so well as at first. At one time F. and K. and G. B. saw a fin sticking up at a little distance back from the head, but neither of us were then observing.

On our return the next day we were again becalmed on the north side of the opening of Lochourn, where it is about three miles wide, the day warm and sunshiny as before. As we were dragging slowly along in the afternoon the creature again appeared over towards the south side, at a greater distance than we saw it the first day. It now showed itself in three or four rather long lines, as in the sketch No. 2, and looked considerably longer than it did the day before: as nearly as we could compute, it looked at least sixty feet in length. Soon it began careering about, showing but a small part of itself, as on the day before, and appeared to be going up Lochourn. Later in the afternoon, when we were still becalmed in the mouth of Lochourn, and by using the oars had nearly reached the island of Sandaig, it came rushing past us about a hundred and fifty yards to the south, on its return from Lochourn. It went with great rapidity, its black head only being visible through the clear sea, followed by a long trail of agitated water. As it shot along, the noise of its rush through the water could be distinctly heard on board. There were no organs of motion to be seen, nor was there any shower of spray as on the day before, but merely such a commotion in the sea as its quick passage might be expected to make. Its progress was equable and smooth, like that of a log towed rapidly. For the rest of the day, as we worked our way home northwards through the Sound of Sleat, it was occasionally within sight of us until nightfall, rushing about at a distance, as before, and showing only its head and a small part of its body on the surface. It seemed on each day to keep about us, and as we were always then rowing, we were inclined to think it might perhaps be attracted by the measured sound of the oars. Its only exit in this direction to the north was by the narrow Strait of Kylerhea, dividing Skye from the mainland, and only a third of a mile wide, and we left our boat, wondering whether this strange creature had gone that way or turned back again to the south.

We have only to add to this narration of what we saw ourselves the following instances of its being seen by other people, of the correctness of which we have no doubt:—

The ferrymen on each side at Kylerhea saw it pass rapidly through on the evening of the 21st, and heard the rush of the water: they were surprised, and thought it might be a shoal of porpoises, but could not comprehend their going so quickly.

Finlay Macrae, of Bundaloch, in the parish of Kintail, was within the mouth of Lochourn on the 21st, with other men in his boat, and saw the creature at about the distance of one hundred and fifty yards.

Two days after we saw it, Alexander Macmillan, boat-builder at Dornie, was fishing in a boat in the entrance of Lochduich, half-way between Druidag and Castledonan, when he saw the animal, near enough to hear the noise and see the ripple it made in rushing along in the sea. He says that what seemed its head was followed by four or more lumps, or "half-rounds," as he calls them, and that they sometimes rose and sometimes sank all together. He estimated its length at not less than between sixty and eighty feet. He saw it also on two subsequent days in Lochduich. On all these occasions his brother Farquhar was with him in the boat, and they were both much alarmed and pulled to the shore in great haste.

A lady at Duisdale, in Skye, a place overlooking the part of the Sound which is opposite the opening of Lochourn, said that she was looking out with a glass when she saw a strange object on the sea which appeared like eight seals in a row. This was just about the time that we saw it.

We were also informed that about the same time it was seen from the island of Eigg, between Eigg and the mainland, about twenty miles to the south-west of the opening of Lochourn.

We have not permission to mention the names in these two last instances.

JOHN MACRAE.

DAVID TWOPENY.

PS. The writers of the above account scarcely expect the public to believe in the existence of the creature which they saw. Rather than that, they look for the disbelief and ridicule to which the subject always gives rise, partly on account of the animal having been pronounced to be a snake, without any sufficient evidence, but

principally because of the exaggerations and fables with which the whole subject is beset. Nevertheless they consider themselves bound to leave a record of what they saw, in order that naturalists may receive it as a piece of evidence, or not, according to what they think it is worth. The animal will very probably turn up on those coasts again, and it will be always in that "dead season," so convenient to editors of newspapers, for it is never seen but in the still warm days of summer or early autumn. There is a considerable probability that it has visited the same coasts before. In the summer of 1871 some large creature was seen for some time rushing about in Lochduich, but it did not show itself sufficiently for any one to ascertain what it was. Also some years back a well-known gentleman of the west coast, now living, was crossing the Sound of Mull, from Mull to the mainland, "on a very calm afternoon, when," as he writes, "our attention was attracted to a monster which had come to the surface not more than fifty yards from our boat. It rose without causing the slightest disturbance of the sea, or making the slightest noise, and floated for some time on the surface, but without exhibiting its head or tail, showing only the ridge of the back, which was not that of a whale, or any other sea animal that I had ever seen. The back appeared sharp and ridge-like, and in colour very dark, indeed black, or almost so. It rested quietly for a few minutes, and then dropped quietly down into the deep, without causing the slightest agitation. I should say that above forty feet of it, certainly not less, appeared on the surface." It should be noticed that the inhabitants of that western coast are quite familiar with the appearance of whales, seals and porpoises, and when they see them they recognize them at once. Whether the creature which pursued Mr. Maclean's boat off the island of Coll in 1808, and of which there is an account in the 'Transactions of the Wernerian Society' (vol. i. p. 442), was one of these Norwegian animals, it is not easy to say. Survivors who knew Mr. Maclean say that he could quite be relied upon for truth.

The public are not likely to believe in the creature till it is caught, and that does not seem likely to happen just yet, for a variety of reasons,—one reason being that it has, from all the accounts given of it, the power of moving very rapidly. On the 20th, while we were becalmed in the mouth of Lochourn, a steam launch slowly passed us, and, as we watched it, we reckoned its rate at five or six miles an hour. When the animal rushed past us on the next day

at about the same distance, and when we were again becalmed nearly in the same place, we agreed that it went quite twice as fast as the steamer, and we thought that its rate could not be less than ten or twelve miles an hour. It might be shot, but would probably sink. There are three accounts of its being shot at in Norway; in one instance it sank, and in the other two it pursued the boats, which were near the shore, but disappeared when it found itself getting into shallow water.

It should be mentioned that when we saw this creature and made our sketches of it we had never seen either Pontoppidan's 'Natural History' or his print of the Norwegian sea-serpent, which has a most striking resemblance to the first of our own sketches. Considering the great body of reasonable Norwegian evidence, extending through a number of years, which remains after setting aside fables and exaggerations, it seems surprising that no naturalist of that country has ever applied himself to make out something about the animal. In the meantime, as the public will most probably be dubious about quickly giving credit to our account, the following explanations are open to them, all of which have been proposed to me, *viz.*:—porpoises, lumps of sea-weed, empty herring-barrels, bladders, logs of wood, waves of the sea, and inflated pig-skins; but as all these theories present to our minds greater difficulties than the existence of the animal itself, we feel obliged to decline them.

D. TWOPENY.

[I have long since expressed my firm conviction that there exists a large marine animal unknown to us naturalists: I maintain this belief as firmly as ever. I totally reject the evidence of published representations; but I do not allow these imaginary figures to interfere with a firm conviction, although I admit their tendency is always in that direction: the figures and exaggerated descriptions of believers are far more damaging to a faith in such an animal than the arguments, the ridicule, or the explanatory guesses of unbelievers. The guess that a little seal was magnified by Captain M'Quhæ into a monster several hundred feet in length is simply incredible: we smile at the conceit, and that is all.—*Edward Newman.*]

Perception in the Lower Animals.—This interesting subject continues to occupy the attention of the contributors to 'Nature.' I entirely agree with the gifted Editor that "the best service he can at present render to the

unravelling of this yet unsolved problem is simply to accumulate facts." The extremely crude guesses which have been so liberally and so unadvisedly published, certainly tend rather to retard than promote a solution. Take the sense of smell, for instance, how can the sense of smell aid a dog crossing a river or an arm of the sea? or a salmon in the ocean? or a swallow in the air? and yet there are constantly recurring instances of the return of marked salmon or marked swallows to the spots where they first saw the light. The excessive crudity, or as a would-be wit has expressed it, "the intense verdure of some natural-history guesses" is most refreshing. The President of a scientific society lately narrated how that a salt-water lake in Norway had lately become fresh; an incredulous wag gravely asked the learned narrator what became of the salt? "Oh! ah! well! yes! I never thought of that—of course it evaporated." The audience appeared perfectly satisfied with this guess, as they were with another philosopher when he guessed that the phenomena of perception were due to the olfactory organs; in a word, that the lower animals in their migrations and movements were led by the nose. All this guessing is part of the old, old error of trying to lead rather than to follow Nature: would that the self-elected teachers could reflect a moment before they guess. One passage quoted from Sir Bartle Frere's paper on "Cutch," implies the exercise of this rare gift, and is more suggestive than anything I have read on the subject. He says, "As elsewhere in the plain country of Sind, and here more conspicuously owing to the absence of any prominent natural features or marked tracts, the best guides seem to depend on a kind of instinct; they will generally indicate the exact bearing of a distant point which is not in sight quite as accurately as a common compass would give it to one who knew the true bearing. They affect no mysterious knowledge, and are generally quite unable to give any reason for their conclusion, which seems the result of an instinct like that of dogs, horses and other animals—unerring, but not founded on any process of reasoning which others can trace or follow." Although giving the name of "instinct" to the phenomenon in question is something like using a synonym, and therefore leaving the subject where he found it, yet we must all of us acknowledge that the word "instinct" conveys an idea of something we have ourselves experienced. I sincerely hope this discussion will be followed up with the vigour shown in its commencement, the contributors bearing steadily in mind the Editor's invaluable injunction, "to accumulate facts," and I would add, abstain from guessing.—*Edward Newman.*

Perception in the Lower Animals.—Reading the paragraph from 'Nature,' under the above heading' (S. S. 3488), reminds me of an incident, something akin to what is there described, which once came under my notice. Some years ago, having occasion to see a person who lets horses, I went to his stable, and there found him in great surprise about the behaviour of both his horses, which were snorting and kicking in a furious

manner; one was fastened to the manger, and the other the man was attempting to get into the stable, but the horse would not enter under any persuasion. What could be the cause of such a strange freak the man could not even conjecture, but at last he recollected that a few days previously a menagerie had visited the neighbourhood, and that he had come into possession of the refuse straw with which the wild animals were supplied, and that he had just littered his horses with some of it, and the consequence was that one would not enter into the stable at all, and the other became quite unmanageable. There is no doubt it was the straw that had caused this commotion, for when it was removed the horses became quieter, the one outside entering the stable as usual, but each of them showing a great deal of caution, as if they feared something. The straw was then thrown to form a bed for the man's swine, but the pigs would rather sleep in the open air than go into that portion of their domicile occupied by the much-shunned straw. I came to the conclusion that both horses and pigs, by their acute sense of smell, had detected the former presence, near or upon their proffered beds, of creatures which were by nature their enemies, and the all-powerful promptings of instinct had induced them to shun even "the appearance of evil," and to act in a manner strangely contrary to what they usually did. The man to whom the animals belonged, at first almost scorned the idea of my supposing that the cause of the horses' refractory conduct was something in the straw, as he said that he had littered his horses with the like on previous occasions, and they had never acted so before; he, however, was convinced on removing what I had supposed was the cause. I must own I should have been sceptical had I heard of and not seen the occurrence.—*G. B. Corbin; Ringwood.*

Bats in Bamboo.—A curious bamboo was found here, each joint having a ring of thorns round it, the joints seldom more than eight inches apart. On cutting some of these to build huts, we found enclosed between the joints of a bamboo four little bats alive. How they came there, how long they had been there, and how, without our assistance, they would ever have got out, I leave to be explained by those who know all about the curious stories of toads found in coal, &c.—*Lieut. R. G. Woodthorpe's 'Lushai Expedition,' 1871—72.*

The Hoolook.—The stillness of the forest was ever and anon broken by the cries of a black monkey known among the natives as the "hoolook." They go about in troops uttering cries resembling the yelping of beaten puppies. One or two commence with a few single cries in one key, when suddenly the whole pack join the chorus in every variety of key.—*Id.*

Strange Conduct in a Hare.—On the 15th of December I was walking on a foot-path in the Dene, when I saw a hare coming slowly towards me. I placed the butt of my gun on the ground, and stood perfectly still to see how near the hare would approach without seeing me. Judge my surprise

when she came right up to me, and stopping began to smell first at the gun, and then, commencing at my toe, she ran her nose up my leg as far as she could reach, rising on her hind legs; and then quickly bringing her fore feet to the ground and clapping her ears to her shoulders, she wheeled round and kicked at me. She then went on five or six paces and commenced feeding. It was difficult to keep from laughing out at this performance, but I managed to keep still, and allowed her to get away. I wonder what "puss" took me for, perhaps a new-fashioned gate-post or something of that sort.—*John Selater; Castle Eden, Durham, April 2, 1873.*

Varieties of Rat.—Within the past year, or year and a half, I have seen some very peculiar varieties of this very troublesome and destructive quadruped. Since last December I have seen five or six of an uniform silver-gray, of various sizes and from different localities. Such variation, however, was not new to me, as I preserved one and saw others of a like colour during last summer. I have also seen another of a pale yellowish brown,—much the colour of a leveret,—with a darker stripe down its back; but the most remarkable variety I have ever seen was one, a few months ago, in which the prevailing colour was a dark brown, upon which were spots of pure white, reminding one of a prettily marked dog. This latter was a full-grown male, but the other specimens were in various stages of growth. I believe the spotted specimen was preserved, but the others I think were not.—*G. B. Corbin.*

Semi-aquatic Habits of the Common Shrew.—I have frequently observed and caught specimens of the common shrew in some wet swampy marshes in this neighbourhood, which are inundated for a considerable time every winter, the water remaining upon them sometimes into March. Early in the spring of 1872, after a sudden flood, I found numbers of them on the small patches of high ground left uncovered by the water, and indeed in some places where the ground was quite covered, only the broken-down stems of the reeds, &c., being left above water, and about which the shrews were running with remarkable activity; at times they seemed to be actually running upon the water, as the scum which had formed upon the surface, with a few floating odds and ends, was generally sufficient to support their weight. I have found their nests by the sides of ditches, and in such cases upon the occupants being disturbed they often take to the water, swimming with great ease. The above-mentioned were all examples of the common shrew (*S. araneus*, Linn.). Is it usual for this little animal to frequent such situations as these? I have never been able to meet with the water shrew here till this year, when my brother picked up a dead one, which had a slight wound in the skull, apparently from a bite. This specimen agreed in almost every respect with Mr. Bell's description, except that there was a grayish spot in the centre of the black patch round the insertion of the tail. Several years ago I caught a very large shrew on the banks of a fish-pond

in this county, the dimensions and description of which I have always since much regretted I took no note. I remember, however, that it was black or nearly so, both above and below, but in size it far exceeded Mr. Bell's measurement of the oared shrew (*S. remifer*). My impression is that it was as large as a full-sized male short-tailed field vole. I have several times since searched the place where I found it, but have never been able to meet with a similar one.—*G. S. Rope; Leiston, Suffolk.*

Australian Flying Squirrel breeding in Confinement.—It may interest some of the readers of the 'Zoologist' to hear of Australian flying squirrels breeding in England. A pair which I have had for more than a year in a cage have produced one young one. The mother generally carries it in her pouch, and when she is engaged in feeding in the open part of the cage the father keeps it warm and takes care of it. It is now about a week old, and I do not think it can see yet. If you or any of your correspondents care for more particulars I shall be glad to give them.—*Emma M. Paget; Hoxne, Scole, April 10, 1873.*

Arrival of Spring Migrants, &c.—March 29th.—Stonechat, wheatear, wryneck, swallow; a stonechat and several wheatears observed about the sandhills near Crosby. Wryneck heard twice at Eton, Bucks. 30th.—Three swallows were seen to-day near Eton. 31st.—Plovers have now begun to nest and perform their aerial evolutions. Frogs are waking up from their state of torpidity: I observed several to-day evidently just come from their muddy winter quarters; their backs were covered with a slimy weed, which seemed almost to have taken root in their skins.—*H. Durnford; 1, Stanley Road, Waterloo, Liverpool, April 10, 1873.*

Ray's Wagtail.—Mr. Doubleday (Zool. S. S. 3490) is "convinced" that the wagtails seen by me at Cassiobury on the 15th of January, and recorded in the 'Zoologist' (S. S. 3455), were *Motacilla boarula* and not *M. Rayi*, thereby taking for granted that I had taken no pains whatever to be certain of the identification. Now, as I had watched the birds in question for about a quarter of an hour, and at times had them within a few yards of me, I am quite convinced that they were *M. Rayi*. To anyone acquainted with the two species, the larger size and longer tail of *M. boarula* would always serve to distinguish it from *M. Rayi*. Again, because I referred to the mildness of the season at the time of seeing the birds, Mr. Doubleday seems to think that I supposed that was the cause of their early arrival from their regular winter quarters. Of course I never meant anything of the kind, being of opinion that the pair of birds noticed by me had remained in this country since last summer.—*C. Bygrave Wharton; Bushey, Herts, April 8, 1873.*

Serín Finch at Brighton.—A specimen was taken on the Dyke Road, at Brighton, on the 16th of April. It was brought to Mr. Swaysland.—*'Field,' April 19th.*

On the Colour of the Fauces in Nestling Warblers.—Herbert, in his notes to 'White's Selborne' (Rennie's ed. p. 129, Bennett's ed. p. 177), says:—"In all true Currucaë, which live mainly on vegetable food, the inside of the mouth and throat is of a fine red: in the others of a yellow-orange." I should be very glad if any of your readers would record their observations on this point during the coming season, as I have now-a-days few opportunities of birds' nesting, and I cannot trust my memory in such a case. Signor Bettoni, I may remark, in his recent and great work on the birds of Lombardy, figures the blackcap with pink *fauces*, the garden warbler with buff, the orphean warbler and greater whitethroat with yellow. Mr. Blyth forty years ago quoted Herbert's note ('Field Naturalist,' i. p. 307), with seeming approval, objecting only in the case of the garden warbler; but the evidence of Signor Bettoni rather contradicts the general assertion of Herbert.—*Alfred Newton; Magdalene College, Cambridge, April 10, 1873.*

Nidification of the Kingfisher.—So few instances of the kingfisher nesting away from the neighbourhood of water having been recorded, the particulars of a nest found by me yesterday between here and Aldenham may perhaps be interesting. The handful of fish-bones, on which the six eggs were placed, was at the end of a hole (sloping slightly upwards from the entrance) in the side of an old unused gravel-pit, about two feet from the top of the bank, and just at the bottom of the stratum of clay. The hole, about eighteen inches deep, was the only one in the pit, and must, I think, have been dug by the birds themselves. The nearest water (except small farm-ponds) would be the River Colne on the one side and Elstree Reservoir on the other; the former must be at least a mile distant in a straight line, and the latter about two miles and a half. Finding a broken white egg at the bottom of the gravel-pit led me to discover the nest.—*C. Bygrave Wharton; April 13, 1872.*

Feeding Habits of the Belted Kingfisher.—On page 48 of Mr. Darwin's 'Expression of the Emotions,' I find the assertion, "Kingfishers when they catch a fish always beat it until it is killed." We have, in New Jersey, one species of kingfisher, the *Ceryle Alcyon*, which is exceedingly abundant for about seven months in the year. For several years I have observed them carefully, both feeding and breeding about the banks of Crossweeksien Creek, and I feel certain that I am correct in saying that I have never seen a kingfisher take its food otherwise than by swallowing it whole, while yet upon the wing. The fish having been swallowed, or at least having disappeared, the kingfisher will alight upon the branch of a tree, and will then, frequently, stretch out its neck, and go through a "gulping motion," as though the fish was not entirely in the bird's stomach, or perhaps was only in its œsophagus. In the thousands of instances that I have witnessed of these birds catching small fish, I never once saw a fish taken from the water and killed before being devoured. So far as my recollection serves me, in the large majority of instances, the kingfisher, after darting into the

water and securing a small cyprinoid, will emerge from the stream, uttering its shrill cacophonous scream, as if rejoicing over the delicate morsel it had captured, and not scolding at its ill-success, as has been thought; for we have frequently shot them as they rose from the water, and *invariably* found a fish, still alive, in the stomach or œsophagus. Indeed, I cannot see how this characteristic cry of the kingfisher could be accomplished with a fish struggling in its beak. When the fish, from its size or other cause, is retained in the œsophagus until the bird alights, the movements of the bird, to effect the swallowing, are very similar to those of a pigeon while feeding her young. The neck shortens and swells; the feathers are ruffled and the wings slightly open and shut two or three times. So far as my observations of the *Ceryle Alcyon* extend, Mr. Darwin's remarks will not apply to that kingfisher.—*Chas. C. Abbott; Trenton, New Jersey, Jan. 14.—'Nature,' March 13.*

Cuckoo's Eggs.—The views of Dr. Baldamus on this subject were made known to the British public in 'Chambers' Edinburgh Journal,' No. 208, for December, 1857: this fact was mentioned by an anonymous critic in 'The Academy,' vol. i. p. 105. I have not the 'Journal' at hand, but Professor Newton has corroborated the statement.—*E. Newman.*

Cuckoo's Eggs.—I am surprised that no one has asked the rather pertinent question, "If the cuckoo is able to assimilate its egg so closely to the eggs of the bird it selects as the foster-parent of its young, how can any one point out which is the cuckoo's egg in the nest?" For my part, I do not believe that these so-called cuckoo's eggs which so closely resemble the eggs of sedge warblers, black redstarts, redbacked shrikes, &c., are cuckoo's eggs at all; for, as far as my experience goes, there is hardly any bird's egg *which varies so little* as the egg of the cuckoo, and in my birdnesting days I have seen a good number of *bonâ fide* cuckoo's eggs, and since then in the collections of various friends, and all these eggs possessed the same character of colouring, &c., which, as Mr. Henry Doubleday well says, makes the egg of the cuckoo well known even to the village urchin.—*Murray A. Mathew; Bishop's Lydeard, April 2, 1873.*

Eggs of the Cuckoo.—As a lover of the feathered tribes, I may be allowed to offer my very small item of experience with regard to the above question, about which my more learned brethren have had more than one discussion; so it is with some degree of diffidence I offer my scanty observations. The two nests in which I have most frequently found a cuckoo's egg are the hedgesparrow and meadow pipit, more commonly the latter. I have at different times taken scores of nests of the redbacked shrike, but on no occasion have I found a cuckoo's egg in them; neither have I ever seen a cuckoo's egg bearing the least approach to the blue of the eggs of the hedgesparrow and redstart. Some two or three seasons ago I noticed that whenever I passed along a particular hedge-bank in the meadows a cuckoo was

always to be seen somewhere in its vicinity, so I concluded that an egg had been deposited not far off. I searched the herbage very closely, and at last found what had been so attractive to this summer-loving bird, *viz.* a nest of the blackheaded bunting containing a cuckoo's egg and five of the rightful owner's. Four of the bunting's eggs were of the usual colour and markings, but the other was white, with a single small dark spot upon it. As they lay in the nest I thought they were rather a motley group. On another occasion I found a meadow pipit's nest containing six of its own eggs and one of the cuckoo. My limited experience would point to the fact that cuckoo's eggs are less variable than many other species as to colour and marking, unless indeed their colour is so variable that they are often confounded with the species amongst which they are laid, for as a birds'-nesting schoolboy I was often surprised at the abundance of the cuckoo compared with the number of its eggs found in a season; and provided that each female lays more than one egg, which I believe is said to be the case, the proportion seems still greater, as the birds always appeared to be ten to one against the eggs. Probably an unskilful way of finding the egg is the chief cause of such apparent disparity, but I have noticed that the parent cuckoo generally loiters about the spot where her egg is deposited, unless she has a circuit,—spots in which she visits at intervals,—and thus becomes a kind of overseer of her scattered brood. I never found more than one cuckoo's egg in the same nest, nor is it often that nests containing a cuckoo's egg are placed very near to each other. Does the rightful owner of a nest court the honour of rearing the young cuckoo, or does the parent cuckoo introduce her egg into the nest stealthily during the absence of its builder? If so, why do we often see small birds mobbing a cuckoo? Is it love or fear that prompts the performance, as these smaller birds in like manner tease rooks and hawks? That the cuckoo introduces her egg into the nest with her foot or bill sometimes is, I think, unquestionable, as the pipit's nest before adverted to was in such a situation, under a large tuft of heather, that no cuckoo could possibly have laid in it, and I found the nest by the mere chance of seeing the pipit come out, after nearly treading upon it.—*G. B. Corbin.*

Erratum.—In my short note, "Gray Phalarope and Pike" (S. S. 3492), the first sentence of the paragraph should read, "The gray phalarope seems to be comparatively rare along the Hampshire coast during *this* winter."—*G. B. C.*

Woodcock at Clapton.—On the 2nd of April a woodcock flew against a window in Claymore Road, Upper Clapton, and was taken up nearly dead.—*'Field,' April 19th.*

Dark Variety of the Common Snipe.—February 8th. To-day I procured from our market a *Scolopax gallinago* whose whole chin, throat, and stomach were of a dull slate-colour.—*H. Durnford.*

Waders flying at Dusk.—March 22nd. This evening, about sunset, I observed large flocks of dunlins and gray plovers, with a few curlews, winging their way up the Mersey: I have noticed the same thing before on bright evenings. I believe they fly to the extensive mud-banks above Liverpool to feed during the night, and take the opportunity of passing the town when they will not be molested. They only fly on fine nights, and are then very intent on reaching the desired goal, frequently passing close to one; and the wary old curlew not performing his usual curve to keep out of gunshot.—*H. Durnford.*

Common Cormorant and Herring Gull returning to Nest at Flamborough Head.—In a note, dated March 29th, Mr. Bailey, of Flamborough, informs me that this spring both the cormorant and herring gull have returned to nest on the cliffs. Both these species formerly nested in some numbers at Flamborough, but were driven away by the ceaseless persecution of the shooting excursionists. Speaking of the Speeton Cliffs, he says that he never before saw so many birds in all his life. When a gun was fired, the birds (guillemots, razorbilled auks, puffins, and kittiwake gulls) came off the ledges in such numbers as "fairly to darken the sky." On the 31st, he shot two ringed guillemots, and saw about ten others.—*John Cordeaux; Great Cotes, April 3, 1873.*

Blackheaded Gulls and Fieldfares.—On Sunday, the 6th instant, whilst walking near Grendon, five miles from here, a flight of about a dozen black-headed gulls (*Larus ridibundus*) skimmed over the ploughed fields, some of these within twenty yards of my head: they were passing to the south-west. I also observed two rather large flocks of fieldfares. Is it not rather late for these birds to be with us in quantities?—*Egbert D. Hamel; Tamworth, April 8, 1873.*

Ostrich-Farming at the Cape.—We have much pleasure in supplying a few facts gleaned from Mr. G. F. Heugh, of Aberdeen, who is a most intelligent and enterprising ostrich-farmer. The fine parcel of "tame" feathers, as they are termed, which were offered on the public market yesterday, and realized what we believe may be considered very satisfactory prices, were the pluckings of fifty-four birds, about fourteen months old, running upon the farm of Messrs. Heugh and Meintjes, in the Aberdeen district. The lot weighed 16 lbs., which is a very good yield for young birds. The feathers were all taken from the wings, no tails (except 10 oz.) having been pulled. The black feathers have not yet become matured, but will be fit for plucking in October next. Mr. Heugh farms near Aberdeen, and has a flock of seventy birds, that run upon an enclosed land, extending over some 1600 acres, which is kept exclusively for their use. The enclosure is made by a stone wall, and in most places four feet high, but where stone was difficult to get, by wire fencing. The construction of a stone wall costs, at an average, 10d. per running yard; the wire cost, put

up with four wires, 8d. per yard; the wire required to be filled in with bushes, to prevent the ostriches hurting themselves, as when the wires are bare the birds are apt to run up violently against them, through not seeing any impediment to their flight. The first crop, or "chickens' feathers," should be allowed to remain on the birds at least ten months; they are of little value and protect the second crop, which is much better in consequence. As a rule ostriches do not pair until they are three years old, but there are exceptions when the birds have been brought up on luxuriant pasturage.—*Cape Monthly Magazine*.

[As a natural-history question quite apart from ostrich-farming, will some of my correspondents at the Cape inform me what authority there is for supposing that ostriches *pair* at all? The opinion that ostriches are polygamous is very general, but the frequent recurrence of the term "pairing," and of similar expressions, leads to a belief that this is still an open question.—*E. Newman*.]

Possession Island.—As this bleak spot has been spoken of as a station for observing the transit of Venus, the annexed description may have some interest, if only as a caution. "We found the shores of the mainland completely covered with ice projecting into the sea, and heavy surf along its edge forbade any attempt to land upon it; a strong tide carried us rapidly along between this ice-bound coast and the islands, amongst heavy masses of ice, so that our situation was for some time most critical; for all the exertions our people could use were insufficient to stem the tide. But taking advantage of a narrow opening that appeared in the ice, the boats were pushed through it, and we got into an eddy under the lee of the largest of the islands, and landed on a beach of large loose stones and stranded masses of ice. . . . The island is composed entirely of igneous rocks, and is only accessible on its western side. We saw not the smallest appearance of vegetation, but inconceivable myriads of penguins completely and densely covered the whole surface of the island, along the ledges of the precipices, and even to the summits of the hills, attacking us vigorously as we waded through their ranks, which, together with their loud coarse notes, and the insupportable stench from the deep bed of guano, which had been forming for ages, made us glad to get away again, after loading our boats with geological specimens and penguins. Owing to the heavy surf on the beach, we could not tell whether the water was ebbing or flowing; but there was a strong tide running to the south, between Possession Island and the mainland, and the 'Terror' had some difficulty to avoid being carried by it against the land-ice. Future navigators should therefore be on their guard in approaching the coast at this place."—*J. D. Hooker, as quoted in 'Nature'*.

Lumpfish or Lumpsucker.—The lumpfish (*Cyclopterus lumpus*) has been taken here to-day at surface in mackerel-nets in deep water, at least thirty fathoms. It was a male fish, in excellent condition, and full of milt, and in size nearly as large as the full-sized female; but its colour, instead of inclining to red, as is said to be the case in the male of this fish, was the usual dull leaden blue of the female over the back, inclining to the usual dirty white on the belly. The liver was remarkable for its size.—*Thomas Cornish; Penzance, March 28, 1873.*

Proceedings of the Entomological Society.

March 17, 1873.—Prof. WESTWOOD, M.A., F.L.S., President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors;—‘Proceedings of the Royal Society,’ No. 142; presented by the Society. ‘Proceedings of the Scientific Meetings of the Zoological Society of London for the Year 1872,’ and Index 1861—70; by the Society. ‘The Canadian Entomologist,’ vol. v. No. 1; by the Editor. ‘L’Abeille, 1872,’ livr. 3 & 4; by the Editor. ‘The Entomologist’s Annual for 1873’; by H. T. Stainton, Esq.

Election of Member.

M. Ernest Olivier, of Moulins (Allier), France, a grandson of the celebrated French entomologist of that name, was balloted for and elected a Foreign Member.

Exhibitions, &c.

The President exhibited a specimen of a very rare species of *Paussus* from Abyssinia, in which the hinder part of the thorax was constricted, quite unlike any of the other species.

Mr. F. Smith exhibited a further collection of ants sent by Mr. G. A. James Rothney, from Calcutta. They were collected by him in a very restricted area, principally in the Eden Gardens, Calcutta, between the months of June and October of last year. The specimens which Mr. Smith had been able to determine were thirty in number, namely:—

Formicidæ (eight species).—*Camponotus compressus*, *Fabr.*; *C. sylvaticus*, *Oliv.*; *C. opaciventris*, *Mayr.*, n. sp.; *C. Bacchus*, *Smith*; *Polyrhachis spiniger*, *Mayr.*, n. sp.; *P. Shrinax*, *Roger*; *P. lævissimus*, *Smith*; *Æcophylla smaragdina*, *Fabr.* *Poneridæ* (six species).—*Bradyponera longitarsis*, *Mayr.*, n. gen. & sp.; *Lobopelta chinensis*, *Mayr.*; *L. mutabilis*, *Smith*; *L. punctiventris*, *Mayr.*, n. sp.; *L. diminuta*, *Smith*; *Diacamma vagans*, *Smith.* *Myrmicidæ* (fifteen species).—*Crematogaster Rothneyi*, *Mayr.*, n. sp.;

Hypoclinea gracilipes, Mayr.; *H. excisa*, Mayr.; *Holcomyrnex indicus*, Mayr., n. gen. & sp.; *Pheidolacanthinus lævifrons*, Mayr., n. sp.; *Monomorium latnoda*, Mayr.; *Solenopsis geminata*, Fabr.; *Pheidologeton labriosus*, Smith; *Pheidole javana*, Mayr.; *Typhlata tricarinata*, Mayr., n. sp.; *T. brevicornis*, Mayr., n. sp.; *Sima rufonigrum*, Jerdon; *S. atrata*, Smith; *S. carbonaria*, Smith; *Myrmecaria subcarinata*, Smith. *Cryptoceridæ* (one species); *Meranoplus bicolor*, Guer.

Thus, there were nine new species, two of which were new genera, and the collection contained several others, apparently new, requiring further examination. Mr. Smith directed attention to the fact that Mr. Rothney had very carefully collected the sexes of the different species, which was of the utmost importance to Science. Mr. Rothney had also, in a most liberal manner, allowed Mr. Smith to select a complete series of specimens for the British Museum. Connected with Mr. Rothney's collection were also three examples of what appeared to be the ant, *Sima rufonigrum*, placed side by side; but on close examination one of them was found to be a spider of the genus *Salticus*, having its anterior legs purposely removed, causing it to present a striking resemblance to the ant, which, like it, inhabits trees.

Mr. William Cole exhibited some magnificent species of *Bombycidæ* collected by Dr. Seaman, near Pine Town, Port Natal.

Mr. Stevens remarked that a hybernated specimen of *Vanessa Antiopa* had been seen on Sunday last in a church at Redhill.

Papers read, &c.

Mr. Bates communicated "Descriptions of New Genera and Species of Geodephagous Coleoptera from China, founded principally on Collections made by Mr. George Lewis."

Mr. Albert Müller communicated the following notes:—

1. *Arazocerus coffeæ* at Basle.—"On the 29th of September, 1862, while attentively watching the unpacking of some freshly-imported bags of Java coffee, in a warehouse at Basle, a very lively specimen of this beetle came tumbling out of one of the bags. I secured it and kept it alive for some days. In a letter dated the 14th of March, 1873, which I have just received from my lynx-eyed friend Herr H. Knecht, of the same city, he tells me that he can now get this species in any quantity at Basle. It is well known that this species of *Anthribidæ* feeds in the larval state on raw coffee-berries; hence its introduction and capture in commercial emporia on the coasts of different continents need cause little surprise; but the two facts here recorded illustrate once more the indubitable axiom that insects living on merchandise are spread

chiefly along the main trade-route, and become acclimatised along their whole course, Basle being one of the chief markets where Central Europe stores and disposes of the purchases derived from Mediterranean and Atlantic ports."

2. *Tribolium ferrugineum* in *Ground-nuts*.—"In the summer of 1863 a cargo of ground-nuts (*Arachis hypogæa*) arrived in the port of London direct from Sierra Leone. On arrival the usual samples were drawn, when it turned out that the husks were riddled by countless holes, while the kernels were half eaten up by myriads of larvæ and imagines of *Tribolium ferrugineum*. So completely had they done their noisome work that in the numerous samples examined scarcely an intact kernel could be found. If a nut was opened the whole interior was often found to be converted into a living conglomerate of larvæ, pupæ and imagines of *Tribolium*, accompanied by the larvæ and perfect insects of a *Rhizophagus* preying on the former, the whole mass being wrapped up in a layer of cast-skins and excrement. As no purchaser could be found, owing to the deplorable state of the cargo, the work of destruction continued through the months of August, September and October, the owners being unwilling to take a considerably lower price than had been calculated upon. A fresh proof how the marketable value of an article can become reduced through delay and ignorance on the part of its owner."

Mr. Dunning read the following "Further Note on *Atropos pulsatoria*, with reference to Dr. Hagen and Mr. W. A. Lewis."

"There is on the table this evening an abstract of Mr. Lewis's paper, 'On Dr. Hagen's treatment of *Atropos pulsatoria* and *Termes fatidicum*' (Proc. Ent. Soc. 1872, p. xl.), in answer to some remarks I made on the 4th November, 1872. If the Society is not weary of the subject, I should like to say a few words, and will be as brief as possible.

"Sympathising with Mr. Lewis in what I conceive to be the main purpose of his 'Discussion of the Law of Priority,' but feeling that a good cause ought not to be supported by a misrepresentation of facts, I ventured to point out what I considered, and still consider, to be an error on Mr. Lewis's part. And I certainly was sanguine enough to expect that when the mis-statement was pointed out, it would be at once withdrawn.

"However, Mr. Lewis does not see the matter in this light, and contends that he has made no error of the kind I supposed. He says that I have written in the language of apology only the same things which he has written in the language of fault-finding; that I have concluded he was under some misconception from failing to understand that he considers worthy of reprobation what I pass by as nothing; that I have come forward to justify Dr. Hagen for having published a Synopsis of the British Psocidæ without an investigation of the species.

"If this be a fair account of what I said, my meaning must have been very ill-expressed. I refer to Proc. Ent. Soc. 1872, p. xxxiv., for what I did say, and will only add that I lent Mr. Lewis the MS. of my paper to prepare his reply. If the above be his understanding of what I have written, I can scarcely feel surprised that he has misrepresented Dr. Hagen.

"Mr. Lewis would have it appear that we are 'at difference not upon facts, but upon the importance attached to them.' The statements which I challenged were these—that 'the Atropos of 1861 is the Clothilla of 1865,' that 'the insect which [in 1861] had a bare back, 15-jointed antennæ, and thickened thighs, has now [*i. e.* in 1865] leather-like winglets, 27-jointed antennæ, and legs not thickened,' and that 'the same insect is described by Dr. Hagen twice over, on two adjoining pages, with opposite structural characters.' I say that these statements are erroneous; and if that is not a difference upon facts, I am at a loss to conceive what is.

"But how does Mr. Lewis meet my challenge? He says, 'Mr. Dunning proves that the Linnean name *pulsatoria* was in 1865 transferred to an insect of the genus *Clothilla*, while in 1861 it has represented an insect of the genus *Atropos*. Granted at once; and therefore the *Atropos* of 1861 is the *Clothilla* of 1865. The very same "*pulsatoria*, *Linné*," was in 1861 described as an *Atropos*, and was in 1865 described as a *Clothilla*.' Mr. Lewis must entertain a very low estimate of the intelligence of entomologists if he thinks they will be convinced by such a verbal quibble. Entomologists describe insects, and apply names to the insects; they do not describe names, and attach insects to the names. On two different occasions Dr. Hagen applied the same name to two different insects having opposite structural characters, on each occasion describing the two insects, and describing them as having opposite structural characters. And Mr. Lewis gravely contends that 'the same insect is described by Dr. Hagen twice over, on two adjoining pages, with opposite structural characters'! Because insect A with one set of characters was at one time called '*pulsatoria*, *Linné*,' and insect B with another set of characters is at another time called '*pulsatoria*, *Linné*,' therefore (says Mr. Lewis) the same insect is described twice over with opposite structural characters! It has never been my lot to encounter a more charming *Non sequitur*. And on this, and on this alone, Mr. Lewis has founded the charge of 'astonishing chicanery' of which Dr. Hagen is said to have been guilty.

"Mr. Lewis says that I have not answered the more important of his two cases, that the criticism impugned by me was based on two instances, but especially on that of *Termes fatidicum*, which is the climax to which *Atropos pulsatoria* was only a step. It is true I did not answer what Mr. Lewis said about *Termes fatidicum*; my object was to correct a specific misstatement, which related only to *Atropos pulsatoria*. On reference to the

'Discussion,' it will be seen that Dr. Hagen's treatment of *T. fatidicum* was a 'RIDICULOUS FARCE,' but his treatment of *A. pulsatoria* was 'astonishing chicanery.' To me the word 'chicanery' has an ugly sound; it was that word which offended my ear, and it was to the charge of chicanery that I addressed myself. And the charge then made as to *A. pulsatoria* having been (as I submit) refuted, Mr. Lewis now brings *T. fatidicum* to the front, and makes a lot of fresh charges based on Dr. Hagen's treatment of this insect, or if Mr. Lewis prefers it 'this supposed insect.' It is as if my learned friend were prosecuting a man (say) for bigamy, and after the defence has been heard, the prosecutor replies by attempting to show that the accused has at all events committed forgery! As before, I decline to discuss the 'FARCE,' preferring to attend to one thing at a time.

"Mr. Lewis goes on to say, 'It is the gist of my complaint that Dr. Hagen taught me in 1861 the exact opposite of what he taught me in 1865, though all the same materials were to his hand at the one time as at the other. I am in my turn surprised that Mr. Dunning should think this amounts to nothing.' Mr. Lewis's surprise is uncalled for; Mr. Dunning has neither said that this amounts to nothing, nor does he think so. The ground now alleged may or may not be a good ground of complaint against Dr. Hagen; but it is quite a different complaint from that which was made in the 'Discussion,' p. 54. The original objection was that the change of name ought not to have been made at all; the objection now is that Dr. Hagen ought to have known in 1861 the facts which induced him to make the change in 1865. 'The simple fact is that in 1861 Dr. Hagen published a Synopsis of the British Psocidæ without an investigation of the species. That is the back-bone of Mr. Dunning's remarks, and is, I presume, the thing he has come forward to justify.' Mr. Lewis presumes too much; I have not attempted to justify what Dr. Hagen actually did, much less have I come forward to justify what Mr. Lewis, without any personal knowledge of the circumstances, asserts to be 'the simple fact,' but which of my own knowledge I say is not a fact. If Mr. Lewis's simple fact is the back-bone of my remarks, the back-bone was very carefully extracted, and my remarks as delivered were invertebrate. Upon what authority, or supposed authority, it is stated that Dr. Hagen published his Synopsis of 1861 without an investigation of the species, I cannot conjecture. But if there be any question on this point, it is fortunate that there are still living several entomologists who can testify to the fact of the investigation having been made. In truth, Dr. Hagen came over to this country for the very purpose of studying the British species.

"That subsequent investigation has proved the existence of errors in the Synopsis of 1861 is perfectly true. But faulty as it was, it did good service in its day; and no one has more readily admitted its shortcomings and corrected its errors than Dr. Hagen himself. To my mind, readiness to

admit and correct one's own mistakes is praiseworthy, not blameworthy. I have no greater love for error than Mr. Lewis has, but I hope I am a little more tolerant of the mistakes of others than he is. All mistakes are to be regretted; but when made, and afterwards found out to be mistakes, surely the best thing is to correct them. It can scarcely be contended that no one should publish anything until there is a certainty of freedom from mistake: on this principle, what would the present state of Science have been? Certainly if Mr. Lewis had waited until he attained immunity from blunder, we should not have had the satisfaction of reading his 'Discussion' in the year of grace 1872."

Mr. Bates put some questions to the meeting, suggested to him by Mr. Darwin, with a view to eliciting information as to sexual differences in insects furnished with ocellated spots; and also as to sexual differences among the Buprestidæ. A conversation ensued, in which Mr. Jenner Weir stated that in *Satyrus Hyperanthus* the spots were more numerous in the female than in the male, and Mr. Butler remarked that *Drusillus* had double spots in one sex. It was also stated that Mr. Saunders had detected corresponding sexual differences in the Buprestidæ.

New Part of 'Transactions.'

Part V. of the 'Transactions' for 1872, completing the volume, was on the table.

April 7, 1873.—H. T. STAINTON, Esq., V.-P., in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—*'Bulletin de la Société Impériale des Naturalistes de Moscou,'* 1872, No. 3; presented by the Society. *'Annales de la Société Entomologique de Belgique,'* tome xv.; by the Society. *'The Canadian Entomologist,'* vol. v., no. 2; by the Editor. *'The American Naturalist,'* vol. v., nos. 2—12, and vol. vi., nos. 1—11; by the Editor. *'Memoirs of the Peabody Academy of Science,'* vol. i., nos. 2 and 3; and *'Fourth Annual Report of the Trustees of the Peabody Academy of Science for the year 1871,'* by the Academy. *'Record of American Entomology for the year 1870,'* by the Editor, A. S. Packard, jun., M.D. *'L'Abeille,'* x., livr. 5 and 6; by the Editor. *'Exotic Butterflies,'* part 86; by W. W. Saunders, Esq. *'Lepidoptera Exotica,'* part 16; by E. W. Janson, Esq. *'Traité Elementaire d'Entomologie,'* by the Author, M. Maurice Girard. *'The Entomologist'* and the *'Zoologist'* for April; by the Editor. *'The Entomologist's*

Monthly Magazine' for April; by the Editors. 'Instructions for the Collection and Preservation of Neuropterous Insects,' by R. M'Lachlan, Esq., F.L.S.; presented by the Author. 'Bulletin de l'Académie Royale des Sciences, des Lettres et des Beaux Arts de Belgique,' t. xxxi.—xxxiv.; 'Memoires Couronnés et autres Memoires,' t. xxii.; by the Academy.

Election of Member.

Mr. Edward Cracroft Lefroy was balloted for and elected a Member of the Society.

Exhibitions, &c.

Mr. Champion exhibited specimens of *Tribolium confusum* and *Ptinus testaceus*, which he had observed in British collections mistaken for *Tribolium testaceum* and *Ptinus fur*.

Mr. Verrall exhibited a specimen of *Laphria flava*, L., one of the Asilidæ, taken in Scotland, not having been hitherto discovered in this country. Also the following Syrphidæ, viz.:—*Syrphus compositarum*, Ver., *S. flavifrons*, Ver., and *S. punctulatus*, Ver., all new species; together with *S. annulatus*, Zett., *S. barbifrons*, Fall., and *S. nigricornis*, Ver. (= *obscurus*, Zett.), the last three having been found in this country for the first time.

Mr. M'Lachlan stated that he had been informed by Lord Walsingham that when on his recent visit to California and Texas he had frequently noticed dragonflies preyed upon by other large insects whilst flying through the air. These latter were, no doubt, some species of *Asilus*; but it was the first time he had heard of dragonflies being preyed upon by other insects, as they had hitherto been supposed to be free from such attacks.

Mr. F. Smith remarked that when examining the box of insects sent to him from Calcutta, by Mr. Rothney, he had come upon a species of *Pentatoma* of a dull brown colour. Mr. Rothney stated that whilst seeking shelter under a tree from the sun, he observed the bark of the tree covered with hundreds of this species, which were of exactly the same colour as the bark, and on this account were not readily noticed. Mr. Smith was not aware why the insect should require this protection. Mr. Bates suggested that they might be subject to the attacks of lizards; but Mr. Meldola thought that it would be useful to them in attacking other insects, which they were occasionally known to do, although usually phytophagous in their habits.

Papers read, &c.

Major Parry communicated a paper on the "Characters of Seven Non-descript Lucanoid Coleoptera, with Remarks on the Genera *Lissotes*, *Nigidius* and *Figulus*."

Mr. Frederick Bates communicated "Descriptions of New Genera and Species of Tenebrionidæ from Australia, New Caledonia and Norfolk Island."

Mr. Albert Müller read the following remarks communicated to him in a letter from Mr. W. F. Bassett, of Waterbury, Connecticut, U.S. :—

“I found, early in the spring, almost as soon as the buds began to swell, large numbers of a female *Cynips*—the species unknown to me—ovipositing in these buds. I had seen the same in the two preceding seasons, but in only a few instances. The insect, standing on the summit of the bud, thrust the ovipositor down between the bud-scales, but did not in any case, so far as I noticed, penetrate the scales. I inferred that the eggs were laid in or on the embryo leaf. I marked several trees where I found these female flies, and watched with much interest to see what species, if any, would be found on them. I found the leaves, when developed, to contain galls of *C. q.-futilis*, *Osten-Sacken*, and with few if any other species intermixed; and the abundance of this species was in close agreement with the number of females ovipositing before the leaves appeared. These galls, when found at all, are usually very numerous, and on some of these trees there was hardly a leaf that did not contain from one to eight galls, each of which would produce from three to five insects. The fly of *C. q.-futilis* (*found in both sexes*) is much smaller than the species I found ovipositing. I think that when we come to find out the true history of these dimorphous and, in one generation, unisexual species, we shall find that those composing the generation of females are generally larger, and perhaps structurally distinct from the bisexual brood. What form of gall these apparently immediate progenitors of *C. q.-futilis* may come from I cannot say, though I still hope to trace them to their gall.

“I repeated last spring the experiment tried several previous seasons,—that of raising a brood of flies from the galls found in the form of irregular swellings on the twigs of an oak growing near my residence. I raised an immense number, all of which were females; and in June I reared still greater numbers, male and female, from enormously swollen petioles of leaves of the same tree. These two broods are remarkably alike, so much so that I could not separate them if mixed. There is, in this instance, no perceptible difference in the size of the individuals composing the two broods.

“It seems to me to be settled now that most, if not all, our species of *Cynips* are double-brooded, and that one of these generations consists of females only. Besides the two cases I have mentioned, where the connexion between the two broods is apparently well established, there are so many one-gendered species that we may reasonably suppose each to be the progenitor of some one of the equally numerous doubled-gendered species, but whose relationships have not yet been observed. I am willing to venture the remark that probably no one-gendered species exists—that those apparently unisexual species, *C. q.-punctata*, *Bassett*, *C. q.-spongifica*, *Osten-Sacken*, and those European species which, though reared in countless numbers,

have as yet been found only in the female sex, will be found to be double-brooded species, one of which will be exclusively female and the other male and female.

"I have two or three years tried to raise a colony of *C. q.-punctata*, *Bassett*, by placing the large polythalamous galls on uninfected trees just as the insects were ready to escape. So far I have failed to rear any galls of this species. Now if these females really reproduce the same kind of gall I ought to have succeeded, for I colonized several hundred individuals on a single small tree, and many more on other trees in different seasons. Of course the inference to be drawn from the failure of my attempt to raise these galls has no scientific value, but had I succeeded in raising the galls the fact would have been received as satisfactory proof that these female flies could produce generation after generation of females without the aid of the male element.

"I take the ground that the reproduction of gall-insects without the intervention of the male is limited to a very few, if not even to one generation; and that all our unisexual species are dimorphic forms of double-gendered species. I wish yourself and all others interested in working out the singular history of this family would give attention to these points. And may I ask you to inform me if anything has been written within a year or two that throws any light upon them, as I am aware that my non-intercourse with the entomologic world for a year or two past has left me far behind possibly on this very point.

"I was able last spring to settle, to my own satisfaction at least, a question raised by myself in the first article I published on the Cynipidæ,—the question whether the woolly galls, *C. q.-seminator*, *Harris*, and *C. q.-operator*, *Osten-Sacken*, were or were not abnormally developed leaves. I took the ground that they were, that the eggs were deposited in the oak-bud, that the small seed-like gall was only a modified leaf-stem and blade, and that the wool was only an enormous development of the pubescence always present on the young leaves. Mr. B. D. Walsh opposed this idea, and, either in a published paper or in a letter to me, denied that the gall had any connexion whatever with the bud or leaves. Last spring I was so fortunate as to find two galls of *C. q.-seminator* in their earliest stage, and was able to watch them in their development. They are really developed from buds, and are, as I supposed, only modified leaves. The smooth shining cell or gall is the petiole of the leaf, and the tuft of long woolly hairs that terminates the cell is only the enormous development of the leaf's pubescence."

New Part of 'Transactions.'

Part I. of the 'Transactions' for 1873 was on the table.—*F. G.*

Notices of New Books.

Birds of the Humber District. By JOHN CORDEAUX. 232 pp. post 8vo, and a frontispiece by Keulemans. London: Van Voorst, Paternoster Row. 1873.

We hear the beat
Of their pinions fleet,
As from the land of snow and sleet
They seek a southern lea;

We hear the cry
Of their voices high,
Falling dreamily through the sky;
But their forms we cannot see.

MR. CORDEAUX has executed his self-imposed task in a remarkably able and honest manner. I have expressed an opinion on several occasions that the local lists of birds frequently possess but little value from their containing so small an amount of matter connecting the birds with the localities; thus Harting's '*Birds of Middlesex*,' an excellent work of its kind, owes its interest entirely to the introduction of so many passages on birds in general, but which have no especial connection with *Birds of Middlesex*. The same may be said of Mr. Sterland's '*Birds of Sherwood Forest*;' of Mr. Clark Kennedy's '*Birds of Berks and Bucks*,' and many others; but in the instance of this '*Birds of the Humber District*' there seems an intimate connection between the birds and their habitats, and the interesting details given respecting them would not apply with the same aptness to other districts, and in many instances would not apply to all. Thus the remarkable immigration of goldcrests (p. 37) and hooded crows (p. 62), both familiar and infallible pioneers of the woodcock, have a local interest which cannot be transferred to Berks, Bucks, Middlesex, or to Sherwood Forest. The same is still more applicable to the shore birds; it is to the Humber, in an especial manner, that all the observations respecting them apply; they are nearly all indissolubly connected with the Humber, and not with the other places where they also perhaps make their appearance.

It is always pleasing to find in works of this kind a full and free admission of the sources whence the information has been derived,

if otherwise than from the author's own observations. Like Mr. Stevenson's 'Birds of Norfolk,' Mr. Cordeaux's 'Birds of the Humber' is perfect in this respect: the doctrine of *suum cuique* is religiously observed throughout, and greatly enhances the merit and the value of the publication. In very many books it is impossible to refer to the sources of information, so great have been the talent and ingenuity exercised in concealing them. Now to the scene of Mr. Cordeaux's researches.

"In the Humber district I include the Humber from the Spurn to its junction with the Trent and Ouse, and the lands adjoining, namely, part of North and Mid-Lincolnshire and Holderness, a district enclosed to the north, the west, and south by the curved sweep of the Wold hills. To the east its sea-board extends from Flamborough Head in the north to Skegness on the Lincolnshire coast in the south. This is a well-defined and clearly marked province both geologically and zoologically. It may be compared to a half-circle or bent bow, the Lincolnshire and Yorkshire Wolds forming the bow, the coast-line the string; whilst the great river itself is like an arrow placed in the string and across the bow, dividing the district into two nearly equal divisions."—*Introduction*, p. v.

The migratory birds visiting this district in the autumn and winter almost invariably come from the direction of the sea, arriving on the coast in lines of flight varying from full north to east, the gray wagtail (*Motacilla boarula*), which comes from the west or north-west, being the only exception. The shore birds generally follow the coast-line both in their spring and autumn migrations, and the sea-birds follow the same course, but much farther out at sea, their occasional presence inland being induced only by severe and long-continued storms. In later summer and autumn, birds following the coast-line are pulled up by Flamborough Head, and those which pass this projection are next seen or heard of near Spurn Point, and thence leaving the county will cross the "deeps" and strike the north and north-east coast of Norfolk. There is no doubt the county of Lincoln was for centuries the metropolis of our shore-birds and water-birds, but the drainage of fens, the enclosure of commons, and the improved agriculture have changed all this, for it is now our best farmed county, and has lost its ornithological pre-eminence.

Concerning almost every bird Mr. Cordeaux has some information to give us, whether as regards plumage, nesting habits, food or migration; or should neither of these subjects present any

peculiarity or novelty, occurrences of the more uncommon species are sure to present something worthy of recording: thus we have this very remarkable note touching the last appearance of the kite in Lincolnshire:—

“Mr. Adrian told me (May, 1872) that about twelve years since he has sometimes seen four or five pairs of kites together on the river just below Lincoln. They used to come up to feed upon any floating garbage carried down from the city. About this period requiring a specimen, he one day took his gun and a young tame rabbit that had recently died, and went down to a hollow pollard willow which grew on the bank of the Witham. The rabbit was opened to show the flesh; and then, securing it by a string, he let it float out into the middle of the stream. Concealing himself in the hollow of the tree, he kept a sharp look-out down the river in the direction of the great woodlands where the kites nested, and he had not to wait long, for presently, at an immense distance, he descried one of these noble birds slowly sailing and gyrating on almost motionless wing up the stream towards his hiding-place, all the time, too, intently scanning the waters for any floating object. Arriving at last over the rabbit, it remained for one moment quite stationary, and then dashed downwards, at the same instant falling dead with expanded wings on the water. Thus by gun and trap the last of the Lincolnshire kites passed away.”—P. 215.

At p. 16 we learn that there have been numerous instances of the occurrence in Lincolnshire of the great gray shrike (*Lanius excubitor*), but none (p. 17) of the redbacked shrike (*L. Collurio*), so common a migrant in the south of England; at p. 19 we read that the missel thrush has become much more abundant within the last ten years, and that it immigrates from the north, arriving in flocks at the end of August or beginning of September.

Mr. Cordeaux thinks (p. 22) that we have two races or varieties of the song thrush (*Turdus musicus*), one our familiar garden friend, the other a darker bird, almost as dark as a hen blackbird: on the 8th of December, 1871, he put up a score of these birds from some dry grass in a drain-bank close to the coast, and very far from either trees or bushes. Mr. Gray, in his ‘Birds of the West of Scotland,’ says he observed numbers of the same variety in North Uist, “taking shelter in dry stone dykes, and hopping from one crevice to another like disconsolate wrens.” “I remarked,” continues Mr. Gray, “particularly the unusually dark colour of their plumage, the birds being very unlike those brought up in cultivated districts where gardens, trees and hedgerows attract the familiar songster and its allies;”

and it is remarked in Yarrell's 'History of British Birds,' that "the examples from the Hebrides, where the species is very numerous, are smaller and darker than those from the mainland." There is a note about the fieldfare, which corroborates an observation I have often made and often repeated to incredulous ears. I will quote Mr. Cordeaux before I give my own experience:—

"In severe winters, when there is a scarcity of food, flocks of fieldfares will frequent the fields of Swede turnips, and, like the rook, drill holes into the bulbs. I have shot them in the very act, and found their stomachs quite full of the pulped Swede. This is a bad habit, for it lets the frost into the root and subsequently rots it. Wood pigeons have the same trick; but I believe these latter never attack a root unless previously injured by insects or the bite of hares and rabbits: their beak is not strong enough to penetrate the hard rind of a frozen Swede. Fieldfares come from great distances on winter evenings to roost in some favourite place; a plantation of young larch having much rough grass in it is greatly in demand for this purpose: they roost, as a rule, nearer the ground than the redwing: I have known them roost on the ground like larks, both amongst grass and in shorn stubble."—P. 21.

It is the latter habit I have observed: Nunhead Cemetery rises into a little hill covered with very coarse grass; to this spot the fieldfares repair on a winter's afternoon, often coming for an hour or more, and in a straggling flight, from two or three to a dozen at a time, from the turnip-fields at a distance, and here they roost both on the shrubs and in the grass.

The immigration of goldcrests (p. 37) from the continent in autumn preceding that of the hooded crows, woodcocks, and short-eared owls, induces us to wonder how such delicate and fragile-looking creatures can cross the North Sea, but it is now a fact as well established as that of the woodcocks themselves, and a fact so familiar to dwellers on the east coast of Yorkshire and Lincolnshire, that they have acquired the name of "woodcock's pilots."

The mention of "*large flocks of waxwings*" appearing in Holderness (p. 70) appears scarcely less remarkable.

The wood lark appears to be unknown in the Humber District; Mr. Cordeaux has never met with it in North Lincolnshire.

The snowflake (*Emberiza nivalis*) usually arrives in flocks from the middle of October to the end of November, and leaves in February or early in March: Mr. Cordeaux observes (p. 47) that these hardy but beautiful little arctic birds will find food, and will

even thrive in the severest winters, after all the rest of the small birds have been driven by frost and snow from the cold and exposed marshes, where they feed on the seeds of various grasses picked from the withered bents rising above the snow. They are always excessively fat.

The sand grouse (*Syrhantes paradoxus*) has visited the Lincolnshire coast in considerable numbers; early in December, 1863, a flock of between forty and fifty was seen in the parish of Saltfleetby: about twenty of them were shot; and several other instances of their occurrence in this district have been recorded.

The golden plover (p. 88) is very numerous in the North Lincoln and Holderness marshes during the winter. In mild winters they remain in these marshes in enormous flocks: Mr. Cordeaux considers the local migration of the golden plover very remarkable. He says, "I have frequently noticed a day or two previous to hard weather immense flocks crossing the Humber, often for hours together, all of them going southwards. Besides local migrations dependent on the weather, there are similar movements due to other causes, the chief of which is probably a permanent change of feeding-ground." A peculiarity of the golden plover, common also to the peewit, is their extreme restlessness before wind and rain: they will continue for hours flying to and fro over the marshes on these occasions. Mr. Cordeaux remarks (p. 94) that independently of their specific distinctness, the gray plovers (p. 93) differ from the golden in their habits; they leave the district, on the average, seven or eight weeks later in the spring, and return fully ten months earlier in the autumn: they are strictly marine birds; their favourite haunts are the sea-coast and the muddy shores of large tidal rivers, their presence inland being exceptional: it is exactly the reverse with the golden plovers; they are rarely seen on the flats, and indeed never, except very early in the season, when the land is dry and hard: again, the gray plovers, when in small parties, fly in a line one behind another: in large flocks they fly all in a lump: the golden plovers, as a rule, advance in long extended lines, but afterwards adopt the arrow-head form of flight.

The turnstone (p. 97) feeds in the summer-eaten clover on beetles obtained by turning over the dried fragments of sheep-dung, thus adopting the same course as the most astute and practical entomologist; the various species of Coleopterous insects seem

particularly partial to such localities, and of course fall a prey to the industrious turnstone.

In 1628 cranes occurred in large flocks in Lincolnshire and Cambridgeshire, as we are informed by Ray: the only modern record of a crane in Lincolnshire was recorded by Mr. J. H. Gurney, jun., at p. 1842 of the 'Zoologist' for 1869: it was killed at Hickling Moor, near Lincoln, by Mr. Shuttleworth, on the 20th of July. I cannot resist the temptation to lament once more the slaughter of these noble birds; can any sight be more magnificent than the stately cranes in full possession of life and liberty? even to see them in their paddocks in the Zoo is a treat rarely to be equalled. It is interesting to learn that an attempt was made to avert the total extirpation of British cranes in 1780. Among the Fen laws passed at the court view of free pledges and court-leet of the East, West and North Fens, on the 19th of October of that year, it was decreed that no person shall bring up or take any swan's eggs or *trane's eggs or young birds of that kind*, on pain of forfeiting for every offence three shillings and fourpence. It appears that cranes nested in the Lincolnshire fens so lately as the eighteenth century.

The curlew is common throughout the great part of the year on the Humber shores, leaving in the spring and returning early in August and occasionally in July; the first returning after the breeding-season are usually very large light-coloured birds, which resort to the grass-land in the marshes. It is usual for these birds to leave the coast at daybreak, and feed inland throughout the day in the sheep-walks in company with sea-gulls. In the dry autumn of 1870 a flock numbering about two hundred passed every morning at sunrise over Great Cotes, retiring by the same line, but in small parties and detachments, between four and five o'clock in the afternoon, to the mud-flats, or at high-water to land immediately contiguous to the coast.

With regard to the whimbrel, I must quote the entire passage: it is too valuable to omit, and too terse to condense.

"A common spring and autumn visitant; in the former season visiting the neighbourhood of the Humber during the first week in May with great regularity, and often in very large flocks, numbering occasionally as high as two hundred birds. They leave again for their northern breeding-stations in the third or fourth week in that month, a few as late as the first week in June; and as I have seen them off the coast again in July, they may be said never to be entirely absent in any month. Whimbrels chiefly resort

during the time they remain with us to the pasture-lands in the marshes; and in this respect their habits differ widely from the curlew, which is almost exclusively at this season a shore-bird. Their food consists of worms, Coleoptera, and various insects; and on the 'flats' they pick up small crustaceans from the tidal pools. They are very partial to washing and bathing; coming down to the tide edge each day, and wading out breast-deep, they scatter the water with their wings in sparkling showers over their backs and body. After the bath they stand on the fore-shore gently fanning their wings to and fro, or preening and arranging their plumage.

"Whimbrels are far less circumspect than the curlew, and with a little care and caution may easily be approached within gunshot.

"In the autumn, compared with the large spring flocks, few visit us; at this season they pass over the district without alighting. This autumn migration, which is carried on in the day-time, takes place from the middle of July to the end of September. These migratory flocks vary in size from eight or ten and upwards; I have never observed them to exceed thirty birds. They advance at an immense height, generally in line, one leading, the rest following, not directly, but *en échelon*, and are constantly repeating their call-note, without which indeed, owing to the great height at which they fly, it would be impossible to identify them."—P. 109.

I cannot pass over the avocet without lamenting, as in the case of the crane, its total extirpation from the district. Pennant says, "We have seen them in considerable numbers in the breeding-seasons near Fosdyke Wash, in Lincolnshire: like the lapwings, when disturbed, they flew over our heads, carrying their necks and long legs quite extended, and made a shrill noise (twit) twice repeated during the whole time." In Colonel Montagu's time it bred in the Lincolnshire fens (see 'Ornithological Dictionary,' p. 2), but is now entirely unknown: probably the drainage of the fens, now so extensively carried on, has had as much to do with this change as the mania for killing which afflicts all classes of people in this country.

The woodcock (p. 122) has of course received a good share of Mr. Cordeaux's attention; and I am sure I need offer no apology for making the long extract which follows.

"That those seasons with the prevailing wind from the south or west are never good woodcock years, is well known to all our coast sportsmen; the probability is that, at these times, as they do not alight, they pass over in the night, and are first heard of in the West of England or in Ireland. Those who have seen the weary, heavy, and short flight of the poor bird, the morning of its landing, can understand the physical exhaustion caused by a

rough adverse passage. If not disturbed they lie all day like stones, just where they happen to have pitched, and will in some cases allow themselves to be taken up by the hand. A few hours' rest quickly recruits their exhausted energies, and at night they again resume their flight, which, excepting for the circumstances of the difficult passage, would never have been broken. The autumn of 1870 was one of the best woodcock seasons known for many years on the Lincolnshire coast. On the 18th October a terrific north-easter brought a large flight; on the 26th of the same month there was another very heavy gale from the north-west, and in that and the succeeding mornings great and unusual numbers were shot all along the east coast of Lincolnshire and Holderness. Many sportsmen entertain the opinion that the 'cocks' cross singly and not in flocks, from the fact of their always being found the morning after landing, solitary and some distance apart, and also that single birds are occasionally seen at daybreak coming in from the sea. The probability is that the flights break up immediately on making land, each bird dropping alone. The single birds observed to come at daybreak are doubtless those which have alighted on some of the numerous sand-banks, bare at low water, which fringe our flat Lincolnshire coast, the rising tide compelling them to shift their quarters. The light-keeper at Flamborough told me that he once saw a flight of 'cocks' arrive on the Headland in day-time. They usually reach Flamborough with a north or north-east wind, and drop immediately on landing, either just topping the cliffs, or, in stormy weather, dropping at their base, sheltering in any little cove or hollow worn by the waves at the base of the rocks. The dwellers on the Headland or at Spurn are in the autumn led to expect their arrival by the appearance of the goldcrested wrens, better known as 'woodcock pilots.' It is a remarkable and well-ascertained fact that these little fellows almost invariably precede the woodcocks by a few days; others again draw similar conclusions from the shorteared owl and redwing. On the Lincolnshire coast the rule is that four days after the hooded crows the woodcocks come. As a rule, on their first arrival they are very fat and in good condition; we occasionally, although rarely, meet with an exception. I have weighed them from 12 $\frac{3}{4}$ to as low as 7 ounces."—P. 124.

The dunlin is a favourite with all our ornithologists. Montagu, in his invaluable 'Dictionary' (p. 76), has been very diffuse on its variations; and although at first he evidently considered the dunlin and purre distinct species, he eventually became thoroughly convinced that they were the same species in summer and winter plumage: this combination of two well-known birds obtained careful investigation and confirmation at the hands of Temminck and Selby, and Meyer, fully convinced of the propriety of their conclusions, proposed to annul the technical names of "alpina"

and "cinclus," and to substitute that of "variabilis," a decision which recent writers have very generally approved. It seems strange, but is nevertheless true, that although so much pains has been so efficiently taken to establish the identity of these two quasi-species, another question should arise—namely, a doubt whether there are not two species of birds undergoing the same change of plumage, but possessing slightly different habits, frequenting different situations, and differing slightly in size; the existence of such species or races in birds, as in the dunlin, the song thrush, and many others, has frequently been mentioned incidentally, but has not hitherto obtained that grave consideration which it demands. I proceed to extract Mr. Cordeaux's remarks on this subject:—

"I have long been of opinion that we have two races or varieties of dunlin in this district, the one extremely numerous, coming in immense migratory flocks from the north, and feeding on the muds, retiring at high water to lands adjoining; the other variety or race is scarce, and frequents almost exclusively the muddy border of our large marsh drains. These latter differ very considerably in their habits from the coast dunlin, and are always remarkable for their great tameness, and in this alone exhibit a singular contrast to the wild and shy coast dunlin. For the guidance of future observers, I will state what I consider the principal points of distinction between the two races. The little 'drain' dunlin differs from the more common species, in resorting to the borders of the marsh drains or to the 'fittie' lands adjoining the 'muds' in preference to the flats, and is remarkable for its extreme tameness, permitting a very close approach. In appearance it is a slightly smaller and more delicate-looking bird than the larger type, and has a shorter bill. The winter plumage is paler, with a whiter and more silvery appearance, reminding one of the winter dress of the sanderling. In the summer the plumage of the upper parts, although generally resembling the same in the dunlin, is richer and brighter in colour; and beneath, the black pectoral patch is smaller, less clearly defined, and more broken into with white, with the sides of the body more closely streaked with dusky brown. The note, although it has a general resemblance to the call of the 'coast' dunlin, yet differs in being weaker and more frequently and rapidly repeated. The smaller race is much later in assuming the summer dress."—P. 137.

I shall feel obliged if my readers will record their experience when meeting with these divided or sub-species, or pairs of species; they exist to a very large extent in insects, and I doubt not are

equally common among birds. Care must be taken to eliminate all geographical, seasonal and sexual differences; these are important phenomena, but phenomena the treating of which is fully appreciated, and which have therefore been fully investigated.

The beautiful wild swan, of course, obtains at Mr. Cordeaux's hands the attention which so noble a bird deserves: its musical cry on one occasion attracted his especial attention.

"The cry of the wild swan is extremely wild and musical. Some years since, during the prevalence of a severe 'blast,' I saw forty-two of these noble birds pass over our marshes, flying in the same familiar arrow-head formation as wild geese use—a sight not to be forgotten, not alone for their large size and snowy whiteness, but from their grand trumpet-notes. Now single, clear, distinct, clarion-like, as a solitary bugle sounds the advance—or the tongue of some old hound uplifted when the pack runs mute with a breast-high scent; then, as if in emulation of their leader's note, the entire flock would burst into a chorus of cries, which, floating downwards on the still frosty air, had every possible resemblance to the music of a pack of fox-hounds in full cry—sounds which have doubtless given rise to the legend, common in some form or other to all the northern races, of the demon huntsman and his infernal pack."—P. 156.

Of the blackheaded gull Mr. Cordeaux remarks (p. 201), "I have frequently observed these gulls by hundreds hawking over our marshes for insects, such as the crane-fly, also amongst the autumnal swarms of winged ants. They not unfrequently perch on gates and rails. The peewit gull is an unfailing weather prophet. When they soar high and fly round in circles it is a certain sign of wind and rain within twenty-four hours. I hardly ever knew this indication fail."

At page 208 there is a most graphic account of the arctic home of the glaucous gulls, but as this is copied from Dr. Hayes' 'Open Polar Sea,' and moreover as it relates to those inhospitable regions rather than to the well-farmed flats of Holderness, I forbear from re-quoting it; and here end my extracts from one of the most able and most agreeable local records of British Birds that it has ever been my lot to read.

EDWARD NEWMAN.

A Visit to Corsica. By the Rev. F. A. WALKER, M.A., F.L.S.

OCTOBER 24th. Our night voyage from Leghorn to Bastia, where we arrived between three and four in the morning, proved rather rough, and was performed amid drenching rain and a storm of thunder and lightning, to which the unfortunate Lucchesi labourers, some two hundred in number, with several women and children, and a troupe of actresses *en route* for the Ajaccio theatre, were fully exposed, as they remained on deck until ordered down by our fellow-passenger, the British Consul for Bastia, who kindly paid the difference in their fare, and as many, accordingly, as the second-class cabin would accommodate at once repaired thither. The town of our destination consisted chiefly of white houses, erected for the most part on a steep rise from the harbour, and its hills loomed darkly in the back-ground, owing to the "macchie," or scrub brushwood, that covered their sides, over which the blue lightning, flashing at intervals, produced a singular effect. A small boat conveyed us from the steamer to the quay, and thence we proceeded to the Custom-house, where tall and stalwart women, who bore traces of having been extremely handsome, with coloured handkerchiefs tied round their heads, were in readiness to convey our luggage to the hotel. It was then fair, and the day appeared likely to clear, but was soon again overcast. A deluge of rain ensued, and kept on continuously, with repeated thunder rolling among the hills, so that shortly two very respectable brooks on either side of the steep Boulevard Paoli, where our hotel was situate, appeared to be each using their greatest effort to get to the bottom first. Between twelve and one it grew somewhat finer, and I went out to survey the immediate neighbourhood of the town, and on turning to the right, at the top of our street, found myself already outside its precincts, and close to a quarry, where blocks of white marble lay strewn about,—not the stone of that particular cliff apparently, but no doubt from the neighbourhood. What chiefly attracted my attention, however, was the Barbary fig, overhanging the bank, that remarkable species of Cactus, so frequent in the South of Europe, which I now saw for the first time; it was common enough in this neighbourhood, but abounded like a weed at our second place of sojourn, Ajaccio, where its thick and prickly foliage served as a drying-ground for clothes. With the exception

of the fact that its exterior petals were striped with dark red, the blossom was about the size and tint of an evening primrose, and the plants, owing to their light green, presented at a distance the appearance of a cabbage-garden, until I realised, on approach, that many were twelve or fourteen feet in height, and with woody stems that considerably exceeded a man's leg in thickness and circumference. Their dark red or purple fruit formed a common article of food, but I discovered, to my cost, that one should carefully avoid gathering or even touching the leaves, not on account of the large prickles, but the multitudinous small ones, which worked into the hands almost imperceptibly, and are apt to fester. Any further attempts to pursue my walk were destined to disappointment upon this occasion, as the narrow stony paths that intersected the steep vineyards, were converted into foaming watercourses, owing to the roughness of the weather; and I therefore contented myself with the sight of *Deiopeia pulchella*, and the capture of *Epilachna chrysomelina*, which last proved tolerably plentiful on waste ground in the outskirts of the town.

October 25th. One of the principal sights in the neighbourhood of Bastia is the stalactitic Cave of Brando, distant about six miles north along the coast; and accordingly we paid two visits to the spot, as on this first occasion we had arrived too late in the day for admission to the grotto. The picturesque terrace-road leading thither gave us a favourable impression of the general scenery of the island. To the traveller in Corsica, it may be remarked, one of the most noticeable features in the scenery of that country is the prevalence of the universal "macchie." The vegetation in question is composed of various shrubs, myrtle, wild rosemary (*Rosmarinus officinalis*), dwarf white broom (*Genista Corsica*), abundance of arbutus and heath, but consists chiefly of a highly-scented tree cistus (*Cistus Monspeliensis*), which bears a lilac blossom in the spring. This macchie covers every hill-side, extending from the rugged boulder and craggy scaur of the interior of the isle down to the sea-shore, and thus served as a hiding-place for the Corsican *mobiles*, when unwilling to encounter the Prussians. It may seem superfluous to describe such a well-known tree as the Arbutus, yet those who have not seen its wild profusion growing in masses both above and beneath the circuitous sweep of the mountain roads, the vivid green of its luxuriant foliage, its many blossoms with berries yellow or scarlet, according to the degree of

maturity they have attained, can scarcely form an adequate idea of the singular beauty of this truly handsome shrub. And yet the landscape, as a whole, presents an arid rather than a verdant aspect, since the leaf of the cistus has a sombre hue, that of the rosemary is hoary, and between the various patches of underwood bare spaces occur, and the green and undulating pastures—so familiar to the traveller on the slopes of the Swiss mountains—are here nowhere visible. Grass is scanty, and the island meat in consequence poor, a large portion of what is consumed, as well as milk and butter, being in fact imported from Marseilles. I came across some fronds of the rare fern *Gymnogramma leptophylla*, growing out of a stone wall, when seeking the British Consul's country residence this afternoon, and also gathered, within the shade of the olive groves bordering the road, pink cyclamens (*Cyclamen Neapolitanum*), a finer species than that in the vicinity of the Lake of Como, and having a more crown-shaped corolla.

October 26th. Again to Brando, and this time with better success. The scenery was diversified by the alternate recurrence of a patch of dark green aloes, contrasting with the lighter hue of the Barbary fig and the shady olive grove, succeeded in its turn by red boulders cropping through the banks, then terraced vineyards, and clusters of tall reeds with flower only second to Pampas grass in dimensions. A tramway skirted the road for a considerable distance, for conveying the slate from a large quarry in the neighbourhood. The day was very fine and the sun powerful, and insect life proved correspondingly abundant. *Edusa* was plentiful, and I also noticed *Brassicæ*, *Rapæ*, *Ægeria*, *Lathonia*, *Phlæas*, *Alexis*, as well as a species allied to *Megæra* (*Satyrus Tigelius*). *Deiopeia pulchella*, and both red and blue varieties of *Ædipoda germanica* were met with, and *Acridium tataricum* taking a short and springy flight from off the road into the vineyards. *Coleoptera*, both here and elsewhere throughout the island, proved very numerous; for example, during this walk I took *Asida Corsica*, *Meloe autumnalis*, *Capnodis tenebricosa*, *Bubas bison*, *Ateuchus laticollis*, and *Timarcha Prunneri*. When near our destination we took our lunch under an olive-tree, and proceeding a short way further ascended the hill up a steep path to the grotto,—when we came across the finest growth of *Adiantum Capillus-Veneris* we had yet seen. The fern in question draped an old arch that spanned the ascent to the cave, which is situate in the face of a very bold and precipitous

rock, the property of a private gentleman, and kept perfectly neat, clean, and dry. The inside of the cavern, duly lighted up on the attendance of visitors with numerous candles, was a sight worth coming to see, for stalactites, various in form and dimension, hung from the roof, and others had risen up by gradual formation from the floor to meet them, and thus one large stem was frequently produced, seven or eight feet in length. Several were of the purest white, like carved alabaster pendants, and others resembled flitches in shape; the light placed behind these last shone through them, producing a very pretty effect. Within the dusky recesses of the entrance I took the brownish *Hypena rostralis*, a moth which aptly matched its residence in hue. On our descent we walked on a little distance to the village of Luisa,—“Bella Luisa,” as our host at Bastia called it,—and repairing to an inn kept by a person who had received an emperor’s medal for being instrumental in saving the lives of three persons shipwrecked off that coast, there ordered a carriage for our return.

October 27th. In the afternoon of this day we took a walk inland, winding round to the left above the town, and then making a considerable *détour* round a cultivated glen containing clumps of orange trees beneath, we enjoyed a fine prospect of the sea, Bastia below us to the left, and its citadel at a considerable elevation above us on our right.

October 28th. I visited for the first time what I subsequently regarded as a very favourite resort, a hilly slope in the immediate neighbourhood of Bastia, where *Globularia Alyssum* and wild rosemary displayed their mauve-coloured blossoms, and where I took the very handsome burnished little beetle *Chrysomela Americana* on the latter of these shrubs, besides meeting with *Licimes agricola*, as well as many specimens of *Ateuchus laticollis*, until, on my last visit there, the day preceding my bidding farewell to Corsica, the “*tramontana chiara*,” blowing from the hills across the sea, effectually prevented any further investigations, making all the herbage tremble from its roots. Later in the day we walked out to the new harbour works, composed of large blocks of green serpentine and concrete, but brought nearly to a standstill for want of funds since the outbreak of the Franco-Prussian war. Elba with her mountains, as well as Caprera and Monte Christo, are clearly visible from here in fine weather, but in cloudy seasons the last is always, and the second occasionally, concealed.

October 29. The route from Bastia to Ajaccio, traversing the island in a S.S.W. direction for ninety-four miles, also deserves mention. We started at 11 P.M. on the evening of October 28th in a berlin; the night was brilliant starlight, and occasional glow-worms shone along the bank during the first part of the way. Our progress on this journey was but slow, as the horses were poor, and frequently changed. Near Vescovato, the road, which had hitherto kept a mile or more distant from the sea, strikes inland. and shortly after skirts the Golo for a considerable distance, first along the right bank, then on the left of the stream, which was heard, and occasionally seen by starlight, foaming in its rocky bed. Day broke as we entered Corte, in which town we made a halt of several minutes, with the bronze statue of Pascal Paoli shining indistinctly in the "Place" by twilight, and on resuming our journey we crossed, immediately after, the Tavignano, and then the Restonica, a tributary of the former. The confluence of these two streams takes place directly below the town: the Tavignano is celebrated because at its embouchure occurred almost the first naval engagement on record,—that of Alalea (the modern Aleria), between the Phocæans and Carthaginians, 448 B.C.,—and the Restonica from the fact that the ascent to Monte Rotondo, the second highest mountain in the island, is commenced by following up its gorge, and because on account of its cleansing qualities the locks and barrels of the Corsican muskets in old warfare were dipped in its stream. Chestnut groves were then passed, bright with the rising sun, and strewing the ground with abundance of dropped fruit. We next crossed the torrent of the Vecchio, another tributary of the Tavignano, and ascending to another village, S. Pierre Vecchio, entered directly a new valley, where the road winding round its sides commanded a fine view of the plain beneath, surmounted by steep stony slopes. On reaching our next halting-place, Vivario, we found this Splugen of Corsica nestled amid the hills, and well-known for the practice of the vendetta, to be a dirty town of white houses, but containing a drinking-fountain in the centre, and really a handsome one, ornamented by a figure of Diana armed for the chase, a statue very appropriate to the locality. Then leaving this spot, we commenced ascending the pass, and wound up, chestnuts and aromatic underwood gradually surmounted, till nothing was left but the stiff straight trunks of the Corsican pine in the forest of Vizzavona, overhanging alike the

lower zone and the less lofty forms of vegetation, nothing around their stems except sere and yellow bracken, and no tree contesting their high place, until we came across a wood of beeches, whose foliage, red and yellow with autumn, afforded a brilliant and pleasing contrast to the sombre green of the above. Before we reached this spot, however, in blackened stumps and leafless stems we saw only too evident traces of the fire that lasted for many days, raging in this forest in the month of September, 1866. A driving mountain mist hid the opposite wooded slopes from our view, and further on the trunks of the firs for a considerable distance were swathed with a spreading olive-green lichen (*Sticta pulmonaria*). The posting-house, close to the summit of the pass termed the Foci, is a dreary-looking building, not that it is situate on a desolate waste mountain height, but the lonely forests in which it is embosomed render it quite as lonesome. The descent once commenced, with its turns and windings, is very rapid, and then the wild valley of the Gravona is entered, and pursued for a considerable distance, forming the concluding portion of the journey to Ajaccio.

F. A. WALKER.

(To be continued.)

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 3465.)

MARCH TO MAY, 1873.

Marsh Titmouse.—March 5. This species has been most numerous during the past winter, and I have observed it much more frequently than the usually far more common coal titmouse.

Scaup.—March 5. A flock of these ducks off the creek, males and females in pairs.

Birds on the Flats.—March 19. This morning there were near the mouth of our creek a considerable collection of shore-birds: within the space of a few yards I noticed a magnificent old full-plumaged great blackbacked gull, four mature common gulls, some gray plover, dunlin and ringed plover, many curlew, hooded crows, and single female wild duck.

Starling.—March 18. Large flocks, thousands together, in the coast marshes. They have commenced their spring evolutions.

Fieldfare.—March 18. This afternoon there was a great flock of fieldfares in a ploughed field in a neighbouring parish not far from the coast. I tried to make a careful estimate of their numbers, which could hardly be short of eight hundred.

Brambling.—March 24. A fine old male with a flock of chaffinches in the hedgerows.

Chiffchaff.—March 29. First heard.

Wheatear.—March 31. First observed; a female. Common as this species is in our marshes in the spring, I have up to this date (May 3rd) not noticed another example. Owing to the excessive severity of the spring and the bitter north-east winds, our migrants have been very scarce, few and far between, and remarkable by their silence.

White Wagtail.—April 2. I saw a pair of white wagtails in the marsh this morning chasing and toying together; in the same place (a freshly-sown oat-field) were many pairs of the common pied species. Pied wagtails arrived in considerable numbers towards the end of March and early in April, but only remained a few days in the marshes: although I have been daily on the look-out, these are the only examples of the continental *M. alba* that I have seen.

Hooded Crow.—April 8. Left from the 8th to the 14th. Wind N.E. to E. and S.E.

Redstart.—April 12. First observed, a male, near Barnsley, Yorkshire.

Tree Pipit and Willow Wren.—April 14. Heard and seen near Barnsley. Tree pipit at Great Cotes, April 24th.

Chimney Swallow.—April 17, Great Cotes; at Waltham, within six miles of this place, April 13th.

Sand Martin.—April 19. First appearance, Riby Park.

Fieldfare.—April 20. Large flocks remained with us up to this date. They have daily visited the tops of some high trees on the "beck" bank, the last group of timber between Great Cotes and the coast. I saw a small flock of forty on the 3rd of May.

Golden Plover.—April 21st, three seen; 29th, a pair. All were in full summer plumage.

Bartailed Godwit.—April 24. A pair feeding together on the flats.

Lesser Whitethroat and Ray's Wagtail.—April 28. First seen, Great Cotes marshes; wind W. 27th. Wind N., excessively cold and stormy, with showers of sleet, hail and snow.

Longtailed Titmouse.—May 2. This evening, on the borders of one of the plantations, we found the nest of this titmouse containing two eggs: this was most artistically concealed at the very summit of a spruce, about fourteen feet from the ground. The entrance was to the south and shaded by the highest spray of the fir; there was nothing above excepting the leading shoot of the tree. The outer walls of this marvellous and wonderful structure were compacted of a felt-like mass of green moss, scraps of white lichen, and scales of the spruce-bark, woven together with fine roots and vegetable fibre, spiders' webs and little fragments of wool. The lining was a mass of feathers, mainly those of the rook, misseltoe thrush and wood pigeon.

Cuckoo.—May 1. First heard; wind S.W.

Carrion Crow.—May 1. Although the young rooks are well forward in the nest, the carrion crows are only just commencing sitting. Four eggs taken from a nest in one of the plantations this evening are only slightly incubated.

Variety of Blackbird's Egg.—May 1. Four eggs from the same nest, taken this morning, are considerably more elongated than the ordinary type; their colour altogether is a pale delicate greenish blue, with a very few slight pale brownish dots or splashes.

Common Whitethroat.—May 2. Wind W.; first seen and heard.

Whinchat.—May 3. Wind W.; one seen.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire,
May 3, 1873.

Ornithological Notes from Norfolk. By H. STEVENSON, F.L.S.

(Continued from Zool. S. S. 3403.)

JANUARY.

Snipe.—Owing to the long-continued rains, and consequent floods in the low-lying districts, very large numbers of snipe were found this month on the ploughed lands and turnip-fields inland: I have heard of fifty or more couples flushed in such localities on a single farm.

Bittern.—One killed at Weyborne on the 4th, an unusually small bird, and a fine specimen near Lowestoft on the 7th. Remains of shrimps were found in the stomach of the latter.

Greenfinch.—During the sharp frost in the middle of this month trays full of these birds, nearly all males, with a few cock sparrows, appeared as usual in our market.

Wildfowl.—This winter has been remarkable for the scarcity of fowl in our markets, but the frost and snow towards the end of the month caused a small show of wild ducks, teal, wigeon and tufted ducks, with a few bunches of golden plovers and lapwings.

Variety of the Snipe.—Mr. Norman, of Yarmouth, records in 'Land and Water' (Feb. 1st, 1873), a beautiful fawn-coloured snipe, as killed near Yarmouth on the 13th of January. The markings on the head, wings and back were darkest, and the tail barred; beak and legs light flesh-colour when fresh killed.

Slavonian Grebe.—One in full winter plumage shot on the 3rd.

Variety of the Thrush.—A pretty buff-coloured variety of the song thrush was shot at Salthouse on the 4th.

Woodcock.—About eight or ten couples were hanging for sale in our market on the 7th. Throughout the winter they have been very scarce.

Sheldrake.—Several fine birds have been killed this month, on Breydon and other parts of the coast. A pair brought to Norwich on the 7th were shot at Blakeney, where a vessel had been wrecked having a cargo of oats on board; and these being washed out when the boat went to pieces, attracted much fowl to the spot.

Goosander.—A splendid old male, with rich salmon-coloured breast, was killed on the 7th. The first I have heard of this month.

Goldeneyes and Scaups.—Two fine adult male goldeneyes and a pair of old scaup ducks were sent up from Yarmouth towards the close of the month.

Bittern.—A large specimen, but in very poor condition, was killed near Yarmouth about the 15th.

Variety of the Chaffinch.—A curious male variety, of a grayish buff colour, but showing greenish feathers on the lower part of the back, was shot on the 21st.

FEBRUARY.

Waxwing.—That the appearance of waxwings on our eastern coast during the winter months is not due, as a rule, to the severity of the season, is shown by their occurrence in some numbers in the

present winter of 1872—3. Between the 15th of November and the 8th of February I have notes of some sixteen examples killed in various parts of the county, in date about equally distributed over the period before and after Christmas. The majority of those I have examined have been in remarkably fine plumage, some having from six to seven wax tips on each wing, but none eight, as I have seen on former occasions. When the number of tips is uneven I have frequently found the deficient quill showing traces of friction or other injury. In the most adult birds the yellow markings on the outer webs of the primaries are carried round the tip of each feather, with a more or less clearly defined white edging. One bird killed this season, a female by dissection, differs from any I have ever seen (though I have handled more than a hundred freshly-killed specimens at different times) in having no wax tips at all, even in the most rudimentary state. I believe this bird, from its general appearance, to be a young female, but as even the nestlings are known to show this peculiar feature, this is no question of age, nor can I positively state any reliable distinction between the sexes, short of dissection; young males and females and adult males and females being, relatively, so much alike. Yarrell's statement that females have never more than five wax tips is inaccurate, as I have dissected specimens with six and seven in each wing, the yellow and white markings on the primaries being, in those birds, as fine as in any adult males. By far the larger number of the birds killed this winter have proved to be males. Besides a few stragglers we have had no waxwing year since the memorable winter of 1866—7, when, between the 17th of November and the 7th of January, one hundred and forty-four specimens were killed to my knowledge in Norfolk only, and their abundance was noticed in many other counties. Throughout that time the weather was extremely severe. Mr. Thomas Southwell, when dissecting several of those recently sent to Norwich for preservation, found, in the stomachs of all but two, the remains of whitethorn haws; the exceptions had been feeding apparently on privet berries, the whole intestinal canal being stained a rich purple.

MARCH.

Great Crested Grebe.—About the middle of the month some half-a-dozen of these birds were killed on different broads in this county, just returned to their nesting haunts, but too soon, unfor-

tunately, for the protection of the Sea Birds' Act, the close time in which begins on the 1st of April.

Guillemot.—A bird killed off the coast about the 20th of this month was in full summer plumage.

Sedge Warbler.—Heard and seen first time on the 30th.

Hawfinch.—The mild winter of 1872—3 has been as remarkable for a large influx of this species as the severe season of 1859—60, and though it is to be feared that many of our home-bred birds are amongst the slain, still their simultaneous occurrence in more southern counties, as well as in Suffolk, would seem to indicate a very considerable migratory movement. The time of their appearance also corresponds to that of previous seasons, extending from the beginning of December to the first week in March; and although the larger number have been killed, as usual, in the enclosed districts,—where, for both residents and migrants of this species, old yew trees and gardens stocked with bullace trees have most attractions,—a few have been procured on the coast at Yarmouth, as in 1859, when a large flight alighted in the gardens facing the Denes. On this occasion a considerable proportion of the specimens brought to our bird-stuffers have been killed in and around Diss, and chiefly in one particular garden in the town itself. The number destroyed in that locality alone is variously estimated at between fifty and sixty, of which at least thirty were shot at Diss. Of other examples brought into Norwich to be preserved I have seen ten from East Carlton; one, Buxton; two, Berghapton; two, Kirby; two, Arminghall; four, Lyng; three, Brooke; two, Hethersett; and one, Catton; twenty-seven in all, and these probably represent but a portion of the birds sacrificed when attacking the bullaces in market-gardens. Mr. Thomas Southwell informs me that in all the Diss specimens, the contents of whose stomachs were reserved for him to see, the food consisted entirely of yew-berries; but those from East Carlton and other villages near Norwich, had, in every instance, been feeding on the kernels of a small stone fruit, probably the bullace, as they were seen to frequent those trees. In dissecting them a very powerful smell of prussic acid was evolved from the half-decomposed kernels. The Rev. H. T. Frere, of Burston, received a nestling hawfinch in the spring of 1872, bred in that neighbourhood, and every year adds more instances of this species remaining to breed both in this and the adjoining county.

Ornithological Notes from Devon and Cornwall.

By J. GATCOMBE, Esq.

(Continued from Zool. S. S. 3468).

MARCH AND APRIL, 1873.

March 1. Weather mild, after a storm. Northern diver off the Devil's Point, still in winter or immature plumage, most likely a young bird of the year. Took a short walk into the country; observed a large number of chaffinches, in pairs, feeding amongst the manure scattered over the fields. Sky larks and wood larks plentiful, also in pairs, the males constantly rising and singing joyfully in the air. Curlews plentiful and rather noisy on the mud-banks of Weston Mill Creek. Large flocks of knots, a species seldom seen in this locality after the autumn, have been observed on the mud-flats of our rivers during the past winter.

March 4. Saw *Larus ridibundus* with a perfectly dark head; also another on the 6th. A few days since an immature black redstart was brought to a birdstuffer in Stonehouse: it was killed by an officer, who supposed it to be a hedgesparrow with a red tail. I recollect a poor man once picking up one which I had shot from the rocks, and bringing it to me with the exclamation, "Master, you have killed a fine firey cock linnick!" (meaning linnet).

March 7. Heard two or three pairs of razorbills croaking loudly off the Devil's Point, as they generally do towards the breeding-season, but they were all in winter or immature plumage. Remarked also a young glaucous gull and two black redstarts, one at the Point and the other on the rocks near the Plymouth Citadel. Two redthroated divers were killed in the Sound during the week, both in winter plumage; these birds, notwithstanding the late long-continued gales, have been unusually scarce during the winter, although the northern divers have been so plentiful. Several knots are now exposed for sale in the Plymouth Market.

March 8. Walked for some miles along the coast, and observed a pair of ravens which were breeding near Bovisand, a guillemot in perfect summer dress, some great blackbacked and herring gulls, and a specimen of the water pipit (*Anthus spinoletta*), which species is rarely seen on the Devonshire coast.

March 10. There were many razorbills about in pairs, but in winter plumage, several lesser blackbacked and herring gulls and

some pied wagtails, all in perfect summer dress; and in a bird-stuffer's I saw a beautiful shag in splendid plumage, with a full crest, killed on the 7th; also a cormorant with the white spot over the thigh and a crest appearing, from the gullet of which was taken a large wrasse, thirteen and a half inches long, four inches and a quarter deep, and nine inches and a half in girth, weighing one pound eight ounces: so far down and firmly fixed was this fish in the bird's throat, the end of the tail only protruding, that it was with great difficulty extracted, the small and slippery portion of the tail affording such an insufficient grasp for the finger and thumb, that the feat had at length to be accomplished by the aid of the boatman's teeth. I examined the bird myself, and secured the fish, which I carefully weighed and measured, therefore there can be no mistake as to its size.

March 11. Saw many starlings entering the holes of the walls in which they bred last year. Observed also a beautiful variety of the common sparrow with a white head and neck, the ordinary brown plumage of the back and wings being also splashed with white. Remarkable about a hundred mews (*Larus canus*) feeding in a grass field in the neighbourhood of Plymouth, but some miles from the sea.

March 14. Another black redstart at the Devil's Point, Stonehouse: these birds increase in number on the sea-coast just before their departure for the summer. A chiffchaff was seen in a small garden at Stonehouse on the 17th, after a very strong and cold wind on the previous day. Many razorbills in summer plumage off the coast, and titlarks constantly mounting in the air from the summit of the cliffs, and descending singing with outspread wings and elevated tail, as if already nesting.

March 18. A great many lesser blackbacked gulls still in the harbour, mostly in full summer plumage, but with some brown ones among them. Observed several wheatears and two black redstarts on the coast.

March 21. Wind north-east, very cold with sleet. Went to the Dewerstone Rock, near Dartmoor, on which I observed a pair of ravens; and on my way home, through Bickleigh Vale, met with several longtailed tits in pairs, some goldcrests, and a very large flock of ring doves feeding in a ploughed field.

March 22. Examined a very fine old male scoter which had been killed in the neighbourhood, and some golden plovers with tolerably black breasts.

March 24. Heard some nuthatches uttering their loud twittering calls in the woods, and saw some chiffchaffs. Observed also a few small flights of goldfinches, which are termed "blossom birds" by the birdcatchers in the spring.

March 26. Took a ramble on the coast beyond Bovisand. Watched an oystercatcher feeding on the rocks, and remarked that most of the cormorants had assumed the oval white spot over the thigh, very conspicuous when the bird is flying, and sometimes termed by the fishermen "the watch under the wing;" they also appeared to have attained the crest, &c. Observed to-day another, and I expect the last, black redstart for the season on the coast.

March 31. Weather mild and misty; wind about south. Visited Pew-tor and Vixen-tor on Dartmoor, near which I was much pleased to see a fine pair of ring ouzels, which allowed me to approach within twenty yards of them: these were the first I had seen for the year, but upon asking a man who lived on the moor if he had seen any, he told me that he had seen a solitary one on the 27th; and on further asking if he was quite sure that it was a ring ouzel, his answer was, "Well, zur, I ought to know, living here for so many years, and I zed to my boy, 'There! there's one of them there ring aiseis, and if I had my gun I'd shut en vor my verret'" (ferret). I also met with several flocks of fieldfares on the borders of the moor flying towards the sea in a south-westerly direction. Wheatears on the moor were numerous and large; indeed I have often observed that the wheatears on Dartmoor seem to be larger and finer in plumage than those which remain to breed nearer the coast; but this may be mere fancy on my part. During the past month I have examined, at a birdstuffer's, a buzzard, raven, hooded crow and hawfinch, all killed in the neighbourhood. The hooded crow is but seldom seen in this part of the county. I have never known blackbirds so plentiful as they are this year, which, no doubt, is owing to the Gun License—certainly not to the Wild Birds Protection Act, which I fear will do but little good, since the thrush family, as well as many others, is not included in the Act, and boys are still allowed to tear out nests, eggs and young with impunity. On the first of May garlands and models of ships decorated with flowers, ribbons and *strings of birds' eggs* are carried from door to door through the streets of Plymouth, the eggs having been eagerly collected expressly for the occasion during the preceding month; and I well know that it used to be a custom among the London

boys to carry naked and half-fledged young birds to the Zoological Gardens on Whit-Monday to throw among the eagles and hawks. If we really wish to protect our wild birds why not include *all* in the list, and also prohibit the wanton destruction of their eggs and young? The present Act may be a check on some of the bird-catchers, but I fear that many will disregard it altogether; for on seeing some of these men at their avocation a week or two since, I asked if they were aware that it was against the law to catch birds after the 15th of March. The answer was, "Yes, sir, we know, but perhaps we are not catching birds that are protected,"—at the same time feeling determined that *every* bird should be "good" and unprotected which came into their nets. Now had the words "all wild birds" been mentioned in the Act, there could not possibly be any excuse for them. Then, again, how many people will plead ignorance of even the names of one half of the species mentioned in the list?

April 1. Lesser blackbacked gulls very numerous in our harbour. Observed a pair of razorbills, still in winter or immature plumage, croaking loudly to each other in the Sound.

April 3. Saw and heard several chiffrhaffs at Mount Edgecombe.

April 4. Visited the neighbourhood of St. Clear, in Cornwall. When crossing the river Tamar at St. Germans, on my way down, noticed a large number of lesser blackbacked and herring gulls on the mud-banks and flocks of ring doves on the salt-marshes; many green woodpeckers a few miles from Liskeard, which species, I am glad to add, has become far more plentiful throughout Cornwall during the last few years; I also found kestrels and wood larks numerous; remarked several flocks of fieldfares, lapwings and curlews on the moors; and by the trout-streams many pairs of gray wagtails. Visited the neighbourhood of Launceston, and in the Valley of the Tamar observed several swallows on the wing, three common sandpipers on a small rock in the river, many dippers, and a kingfisher, which latter was constantly flying down the stream with a small fish in its beak, no doubt having a nest and young not far off; and on the river's bank I saw the remains of a waterhen, which had been killed by some bird of prey. In the woods were many green woodpeckers and nuthatches.

April 15. Heard some willow wrens and saw more swallows. Observed with a powerful pocket-telescope some starlings, among

which was a fine old bird that appeared to be altogether of a beautiful glossy black, without any spots even on the back. Saw a female redbreasted merganser, in the flesh, which had been killed a few days before in Whitsand Bay, Cornwall: it was in strong moult.

April 17. Heard the cuckoo in Bickleigh Vale, near Plymouth, and on the 18th the blackcap and tree pipit; wind north, but mild.

April 19. Wind N.E., mild and fine. More blackcaps and a whitethroat.

April 23. Examined a puffin which had been taken in an exhausted state on the coast: it was very emaciated and the stomach quite empty.

April 26. Wind N.E., very cold. Saw a flock of whimbrels flying up the river, apparently just arrived from sea. Had one given to me the same day, in the flesh, which flew on board a ship in the channel about a week before, and was kept alive for some days. I found this bird in a dreadfully emaciated state.

April 30. There were about three hundred lesser blackbacked and herring gulls on the Laira mud-banks, and a great many also in the harbour; indeed I never knew the former species so plentiful as it is just now, and their constant cry when circling high in the air, even over the town, is remarked by everyone.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth.

May 7, 1873.

Large Otter near Plymouth.—On the 8th of March I was much interested in watching a very large otter fishing in the sea, about a hundred and fifty yards from the rocks, diving about just as a cormorant would do, and bringing up a fish every minute, although the sea was rather rough. By and by a large northern diver ranged up alongside, and for a short time otter and diver seemed to be fishing in concert, but I must say that the otter appeared to catch four or five fish to the diver's one. This otter was the largest I ever saw, and I think it must have been the same described in my note in the 'Zoologist' for January (S. S. 3365).—*John Gatcombe.*

Zoology of the Royal Academy. By EDWARD NEWMAN.

My brief remarks on the zoological pictures exhibited by the Royal Academy last year were received with so much kindness and consideration, that I have been induced again to try my hand at art criticism, eschewing, however, the peculiar phraseology of the learned few who may be called "professors of the science," and confining myself to the Johnsonian language I have been writing from youth to old age.

There are certainly this year a much larger proportion of zoological pictures of high merit than I recollect in any previous exhibition; and, whether it be a good or a bad sign I will not presume to pronounce, I think that animal painting has now taken the very highest position in English art. Acres of portraits, interesting only to the painters and the painted, are still present, but serve merely as a foil to those charming pictures which, with or without the animals, must delight every one who has a taste for country life. The self-imposed limit to my subject prevents my noticing the works of the great masters of landscape, Linnell, Vicat Cole and Birkett Foster, and I must confine myself to paintings of which animals constitute the chief subject and the chief ornament.

Mr. CARTER exhibits a very telling picture under the title of *Maternal Felicity* (No. 26); it represents a fallow deer and her fawn, drawn with unusual skill and exhibiting unusual knowledge: the animals are posed with taste and judgment, and painted with great care: there is nothing really objectionable in the title, but it seems rather too sentimental.

By a perversity of genius by no means uncommon, Mr. HARDY gives us a picture of lions without a name, and Mr. POOLE gives the title, *A Lion in the Path* (No. 28), to a picture without a lion; it is a truly fine landscape, but I can find no excuse for the misnomer: if the queer cripple under the shade of the oaks be intended for a lion, I am unable to detect the likeness: not so Mr. Hardy's nameless picture; his conflicting brutes are most manifestly intended for lions, and monstrous ones too, standing on their hind legs, as one often sees dogs, but I think not lions, or any other members of the cat family. Mr. Hardy's idea seems to be borrowed from Mr. Ward's case at the Crystal Palace, called "The Struggle," in which the veritable skins of a lion and a tiger are represented

romping in this canine manner, to the intense delectation of all juvenile visitors. I think Mr. Hardy might with advantage have borrowed Mr. Ward's title as well as his idea. Two lions engaged in this manner for their own satisfaction would doubtless afford a terrible and grand spectacle. The only spectator Mr. Hardy has introduced is a lioness, who seems looking on with all the *sangfroid* of a fashionable lady at similar combats in a Roman amphitheatre.

Mr. FISHER has a large canvas covered with donkeys and geese, which he calls *The Intrusion* (No. 34). The donkeys exhibit the very essence of stolid indifference; the geese, on the other hand, are in a state of rabid and uncontrollable panic; what antecedents have conspired to induce this state of things does not appear; but the violence of the birds is well contrasted with the quietude of the beasts, and if that was the painter's object he has succeeded; but as the donkeys evidently *stood* for their portraits and the geese *flew* for theirs, it follows that the donkeys are the better painted. Mr. Fisher in his brief view of flying geese does not seem to have acquired a very correct idea of their appearance.

Mr. SIDNEY COOPER'S *Monarch of the Meadows* (No. 68) is an improvement of his familiar monotonous style. The monarch is a huge bull apparently standing on an invisible footstool behind a cow and calf which are lying down.

In Mr. G. D. LESLIE'S painting called *The Fountain*, I would invite attention to the magpie: few people know what a beautiful bird the magpie is; they consider it an objectionable, harsh, noisy, mischievous, black and white fellow, with a longish tail. Mr. Leslie has painted him in his true colours, and those colours are very handsome.

That very clever painter Mr. ORCHARDSON has two zoological pictures of considerable merit: one of them, intitled *The Protector* (No. 194), represents a large dog in company with a pleasant-looking lady in a garden; the lady seems to have no need of such a protector; but the dog is made to indicate the approach of a strange, if not unwelcome, footstep: the other picture, *Oscar and Bain* (No. 208), seems to be popular, but I failed to discover its attraction.

Sir EDWIN LANDSEER is again in dreamland, but his dreams are the dreams of genius: he has two paintings. *Tracker* (No. 255) and *Sketch of Her Majesty the Queen* (No. 256), proclaim the painter

in unmistakable accents; but there was no occasion for the explanations to the latter, "Unfinished," and "Her Majesty has not sat for the likeness;" it is no likeness at all: as for Tracker, a very crude sketch of a collie, I can only lament it should be left in so unfinished a condition. There is something extremely pleasing in the white palfrey on which the lady is sitting: grace and gentleness are happily combined.

I doubt whether Mr. Hook's Ornithology is so good as his painting; the former is borrowed, the latter his own. A boy is represented with a knife tied to the end of a stick, and holding up this curious instrument for a gull to transfix himself on, while a second boy is engaged taking the eggs of the gull from a very dangerous situation near the top of a cliff: a girl is holding the second boy by the legs to prevent his falling into the deep green sea, far, far beneath. The picture (No. 254) is called *The Bonxie*, and when I say it is exquisitely painted I am merely saying it is Mr. Hook's. Mr. Hook has selected from Bewick's 'Birds' the following passage to illustrate the scene:—

"It is, however, well ascertained that they [the skua gulls] are uncommonly courageous in defence of their own young, and that they seize, with the utmost vengeance, upon any animal, whether man or beast, that offers to disturb their nests; and it is said also that they sometimes attack the shepherds even when they are watching their flocks upon the hills, who are obliged, in their own defence, to guard their heads, and to ward off the blows of the assailants by holding a pointed stick towards them, against which they sometimes dash with such force as to be killed on the spot. In like manner they who are about to rob their nests, hold a knife, or other sharp instrument, over their heads, upon which the enraged bird precipitates and transfixes itself."—Vol. ii. pp. 211 (1816).

Whether Bewick has sufficient authority for this passage may perhaps be doubted, but the plan or tradition, whichever it may be, of allowing birds to transfix themselves, is much older than the time of our illustrious wood-engraver. In a volume published at Rome in 1622, and intituled '*Olina* (Giov. Pietro) *Uccellaria, overo discorso della natura e proprieta de diversi Uccelli*,' is an engraving (eight inches by six) of birds impaling themselves in this manner, and lettered thus:—" *Del colombaccio e sua coccia*." In the left-hand upper corner you see pigeons transfixing themselves until the spikes are filled, while others, with closed wings, are dropping down headlong, as though disappointed that there were no more

unoccupied skewers. In the distance is a thick grove of trees similarly provided with skewers, towards which clouds of pigeons are tending. In the foreground a lady and gentleman are watching this process of self-immolation, whilst a lad, kneeling beside them, turns a spit on which sixteen or twenty pigeons are roasting.

The Ornithologist (No. 380), by Mr. H. S. MARKS, is the picture of pictures: it exhibits an extraordinary combination of quiet humour, artistic skill, and knowledge of Natural History: the bird-skins are those of veritable birds; every bird is so correctly represented that you recognize it at once, but it has passed through the hands of the birdstuffer, and therefore is not a living bird, but a compound of feathers, skin and wire, brought into that kind of juxtaposition which pourtrays the taste of the taxidermist, but has not the most remote resemblance to the living animal which once inhabited the skin: the legs are ostentatiously wired legs, the eyes ostentatiously glass eyes, excepting in one or two instances where a bit of cotton-wool occupies the cavity: the ornithologist is standing on a pair of steps before a new cabinet with glass-doors, and with his hand and voice is giving instructions to his very neat and *respectable* assistant as to which specimen is to be handed up next: these specimens are all standing, higgledy piggledy, on the floor, and have been just removed from some less spacious and less convenient cabinet now discarded: under one arm the assistant holds a flamingo, and under the other a stork, and these, though for the moment in rather uncomfortable attitudes, seem to be taking a respectful and subdued interest in the proceedings: on the table to the right is a basket containing heads, on another to the left are some brilliant exotics under a glass shade, which is painted as well as if by some old Dutchman; and on the wall is a paper illustrating our knowledge of the Dodo, three figures of that eminent bird being placed in juxtaposition for comparison.

Mr. DAVIS gives us, in No. 453, the cattle which he painted last year, but under an entirely different aspect; then he called his picture *A Panic*; the present painting is intitled *Summer Afternoon*; this year's is the more pleasing picture, last year's the more forcible. I have already dwelt long enough on the extreme difficulty of representing cattle in violent action, but Mr. Davis, like Rosa Bonheur, has attempted and accomplished the feat: he has now mesmerised or *Rarefied* the same panic-struck animals, and has subdued them to all the quietness of lambs. Even Landseer

never exhibited cattle so perfect. Hofner, a Belgian painter, has succeeded equally well in the International, but he and Rosa Bonheur are the only exhibitors Mr. Davis has to fear: until this "Summer Evening" was exhibited Paul Potter's Bull was the perfection of quiet unobtrusive power, but Mr. Davis need not shrink from comparison even with that *chef d'œuvre*. His second picture, *Twilight* (No. 950), will scarcely prove so attractive as *Summer Afternoon*; it has, however, great merit, although not of so striking a character.

Argus (No. 464), by Mr. RIVIÈRE, is a touching picture. Like everything the artist has exhibited, it shows a vast amount of knowledge and of reflection. I may remark it is impossible not to detect a family likeness between the Daniel of last year and the Ulysses of this: probably the same model served the painter for both, but certainly the same feeling prevails in both the beggar king and the unjustly condemned prophet; they exhibit a wonderful similarity: in the beasts there is nothing of this; the poor staghound, conquered by age and neglect, is the embodiment of an inspiration entirely different from that which produced the lions cowering under an Almighty influence they neither see nor understand. The story of Ulysses and his dog Argus does not seem so familiar to the general public as that of Daniel in the lion's den, or indeed as I should have supposed it would be among the educated: I can only judge by the comments of the visitors to the exhibition, not one of whom during the half-hour I was before the picture seemed acquainted with the story. Such observations as these recurred perpetually, "Who was Argus?" "What did he do?" "His dog seems half-starved;" "I wonder he does not fly at the beggar man;" "What an old worn-out hound it is;" "He looks a hundred;" and so forth. Excepting the general mistake of supposing that Argus was the name of the man, I think I heard not a single remark but testified to the painter's skill in conveying what he wished to convey. The readers of the 'Zoologist' will not need to be informed that Argus was a dog and not a man, yet I feel sure they will pardon me for quoting the following explanatory passage from the matchless poet who created both dog and man.

"Thus near the gates conferring as they drew,
Argus the dog, his ancient master knew;
He not unconscious of the voice and tread,
Lifts to the sound his ear, and rears his head.

Bred by Ulysses, nourished at his board,
But, ah ! not fated long to please his lord !
To him his swiftness and his strength were vain ;
The voice of glory called him o'er the main.
Till then in every sylvan chase renowned,
With ' Argus,' ' Argus,' rung the woods around.
With him the youth pursued the goat or fawn,
Or traced the mazy leveret o'er the lawn.
Now left to man's ingratitude he lay,
Unhoused, neglected, in the public way ;
And where on heaps the rich manure was spread,
Obscene with reptiles, took his sordid bed.
He knew his lord ; he knew, and strove to meet ;
In vain he strove to crawl, and kiss his feet ;
Yet (all he could) his tail, his ears, his eyes,
Salute his master and confess his joys.
Soft pity touch'd the mighty master's soul ;
Adown his cheek a tear unbidden stole,
Stole unperceived ; he turned his head and dried
The drop humane ; then thus impassion'd cried :
' What noble beast in this abandon'd state
Lies here all helpless at Ulysses' gate ?
His bulk and beauty speak no vulgar praise ;
If, as he seems, he was in better days,
Some care his age deserves ; or was he prized
For worthless beauty ? therefore now despised ;
Such dogs and men there are, mere things of state ;
And always cherished by their friends, the great.'
' Not Argus so,' (Eumæus thus rejoined),
' But served a master of a nobler kind,
Who never, never shall behold him more !
Long, long since perished on a distant shore !
Oh, had you seen him, vigorous, bold and young,
Swift as a stag, and as a lion strong ;
Him no fell savage on the plain withstood,
None 'scaped him bosomed in the gloomy wood ;
His eye how piercing, and his scent how true,
To wind the vapour in the tainted dew :
Such when Ulysses left his natal coast ;
Now years unnerve him, and his lord is lost !
The women keep the generous creature bare,
A sleek and idle race is all their care.

The master gone, the servants what restrains?
 Or dwells humanity where riot reigns?
 Jove fixed it certain that whatever day
 Makes man a slave, takes half his worth away.'

This said, the honest herdsman strode before:
 The musing monarch pauses at the door:
 The dog, whom Fate had granted to behold
 His lord, when twenty tedious years had roll'd,
 Takes a last look, and having seen him, dies;
 So closed for ever faithful Argus' eyes!"

A second picture by the same accomplished artist is called *All that was left of the Homeward Bound* (No. 986). It has every perfection as far as painting is concerned, but is too painful to gaze on without shuddering: a floating mast is "all that was left of the homeward bound," but lashed to that mast is a young woman; and a white dog is lying across her body: the dog is evidently alive, but in the last stage of suffering and emaciation; the spirit of the woman also, apparently, is hovering in the balance between life and death; the lamp of life is glimmering in the socket: whether it be desirable to introduce such scenes among the portraits of the sleek, succulent physiognomies of the well-to-do, is a matter to be debated: happily our English painters, well-fed themselves, are unequal to the task, and therefore will never make the attempt; so we may feel secure from repetitions of the harrowing scene. A sail appearing on the horizon is the only hopeful spot in the dismal prospect; on this the eye dwells as a *possible*, but most improbable, chance of succour: how can human eye discern an object floating at so great a distance on the surface of the illimitable waters!

Victor and Vanquished (No. 1057), by Mr. BRADLEY, has merits and demerits of no common kind: the freedom with which the Chillingham cattle are drawn, and the judgment with which they are grouped, deserves high praise: the attitude of the victor bull, caressed by one of the cows, is truthful and picturesque; so are the cow and calf on the right, who appear to be contemplating and pitying the dying bull on the left; but that bull himself is a repulsive object; supposing it true, such truth should never be put on canvas, even to gratify our insatiate appetite for sensation, and if indicated, as murders are often indicated on the stage, the pitiful object should not be exposed to our gaze; with this exception, all the other figures are pleasing, and the attitudes bold but not exaggerated.

The colour of these cattle, however, seems too ochreous, and the patches of shadow on their beautiful coats are too spotty; not that I would wish to see these shadows smoothed down and lost, but even the strongest and most effective lights and shades may be so managed that the spectator shall not notice them any more than he does in nature. No one in looking at a living cow sees these shadows at all, but sees a white unspotted cow: no doubt the shades exist, but Potter, Hofner, Landseer, and especially Davis, use them only as in nature: depicting a shadow correctly is an art of the highest quality, but to accomplish this without betraying the pains you have taken is a still higher art, the *ars celare artem*: the wild cattle, as they are called, are not to be studied at leisure, and we do not envy the artist who sets up his easel at Chillingham and waits until they come and stand for their portraits.

EDWARD NEWMAN.

The Wild Cat not a Myth.—As you speak of the wild cat, in the 'Zoologist' for April (S.S. 3482), as a "*reputed* Scotch mammal," a "mythical creature," &c., and say, apropos of Mr. Knox's book, that "it would have been pleasant to have learnt more particulars of" it, I send you a few notes concerning a female specimen I have been the happy possessor of since the middle of March, 1872. She is the largest of the five that I have seen alive, and was trapped in the north-east of Inverness-shire, in which operation one of the bones of her near fore paw—I believe the radius—was splintered; but fortunately not broken quite through; and although she had a very bad leg for some time, it is now healed, and appears to be quite healthy. She came in season the last week in June, after nearly dying from worms, caused, no doubt, by her having been fed largely on liver while I was away from home: she became as thin as a knife, and gradually lost her appetite, until for three days she ate nothing, and then passed a quantity of worms, which she effected, I believe, by eating some hay. I gave her a dose of powdered glass, but never saw any more worms; and from that time she rapidly gained flesh, and became, to a limited extent, tame: that is, although she had never left off her habit of perpetually swearing when receiving a visit, she will come, when tolerably hungry, for any one she knows, out of her "bedroom" to the other half of the hutch-cage she inhabits, to receive food. Rabbits appear to be her favourite dish, but she will also eat water-voles, rats, *weasels*, field mice and house mice, though I do not think she cares much for the last-mentioned animal: pigeons, moorhens, sparrows, and other birds (including eggs), she is very fond of, with the exception, as might be supposed, of rooks, starlings, &c. She will not touch any kind of fish, though so far from

objecting to water, she washes most nights in her water-tin; and every night regularly for several months she used to extract some stick-brimstone from the tin and bury it, together with her dung, in sawdust, which is always strewed in the outer half of the cage. She came in season again this year the last week in March, unluckily while I was away from home, for (as I begin to despair of ever getting a wild Tom), Mr. Bartlett had very kindly promised to send me the hybrid Tom from the Zoo. That they are not "mythical," &c., is amply shown by the fact that they have had six in the Zoo within the last two years, three of which came from Lord Seafield's forest, Balmacaan, in Inverness-shire, where he breeds some (in captivity) every year, I believe. A gentleman in Sutherlandshire had one alive about two years ago, but I do not know whether it is still in existence; and a gentleman in Oxfordshire has bred several hybrids from one: the pair now in the Zoo were bred and presented by him. And I myself was sent a second specimen in September last, but it had been badly trapped, and was delayed on the journey, added to which it was a "bird of the year," and therefore had not come to its full strength; the consequence of all which was that the poor thing died from mortification of the injured paw.—*A. H. Cocks; Great Marlow, Bucks, April 29, 1873.*

Wild Birds Protection.—Mr. A. Herbert moved for a Select Committee, with power to take evidence, to inquire into the advisability of extending the protection of a close season to certain wild birds not included in the Wild Birds Preservation Act of 1872. He said last session a Bill was brought in to protect a similar class of birds. It was enlarged so as to include all birds, and in the end a compromise took place, to the effect that hon. members who opposed legislation would cease to do so provided certain birds were not included. He had received a great many letters from different parts of the country on the subject. One young lady—(laughter)—wrote to inquire why the amiable and accomplished chaffinch—(renewed laughter)—had been left out of the Act. Another wrote, "What sort of a protection is this when you find no room for the thrush?" And a third wrote, "If the members of your House of Commons are fond of pleasant sights and pleasant sounds, I cannot help thinking that the song of the blackbird will always be a reproach to them." (Laughter.) All he asked for was an inquiry, and he had the fullest confidence that his clients would make out a case for including these and other birds in the Act of last session.

Sir H. Hoare hoped the House would grant the Committee, not only on the score of humanity, but because linnets, chaffinches, and birds of that description were interesting in themselves, and afforded pleasure to many persons amongst the humbler classes.

Mr. J. W. Barclay objected to any further legislation in the direction contemplated by the hon. member for Nottingham. ("Oh, oh," and "hear,

hear.") The greatest inconvenience was caused to seedsmen and market gardeners by the birds which the hon. gentleman wished to take under his protection. ("Oh, oh.")

Mr. C. S. Read also opposed the motion.

Mr. Dillwyn thought the granting of this inquiry would be the means of obtaining much useful information in regard to the habits of birds. Hedge-sparrows had been condemned because they were unfortunate enough to bear the name of sparrow, although they were as distinct in their habits and nature from sparrows as were owls from pigeons. (Laughter.) As a practical observer of birds all his life, his conviction was that there was no bird that did not do more good than mischief. What was wanted was to prevent the wholesale capture or destruction of these birds for sale during the close season. ("Hear, hear.")

Mr. Liddell and Mr. Cowper-Temple supported the motion.

Mr. Bruce thought it was for the interest of all parties that this inquiry should take place. ("Hear, hear.")

After a few words from Mr. Assheton and Mr. Parker, the House divided.

For the motion 162

Against it 16

Majority 146

—'Daily News,' April 29, 1873.

Wild Birds Protection Act.—As there appears to be an endeavour to make some alteration or other in this Act during the present Session of Parliament, it is, I think, incumbent on all who love common sense and justice, as well as sport and Ornithology, to speak out upon the subject. It is possible that some of the remarks I am about to make will be unpalatable both to sportsmen and ornithologists, but it must be borne in mind that when legislation is proposed there are other considerations to be noted in the matter besides sport and Ornithology. Let me say then at once, and plainly, that this Act appears to me to be both ill-advised and excessively ill-drawn. Attention has been called to its glaring defects by Mr. F. O. Morris and others in the public journals, but it seems to me objectionable in *principle*, as well as in its utter failure to answer the end for which it has been designed. The Act itself was conceived by short-sighted sportsmen, and brought forth by ornithologists many generations behind the times; the former wished to extend the doubtful benefit of the Game Laws to a few more objects of sport, the latter jumped at the chance offered of fostering by Act of Parliament the objects of their studies. I will not waste my time, nor your space, by attempting to prove the patent errors of both; the time has passed when either sport or ornithological studies can be ensured by the legislature. In spite of all the Acts of Parliament that could be devised, neither sporting nor Ornithology will ever be allowed to stand long in the way of those rapid changes by flood and by field which are inevitable in every

country where the area is limited and the population fast increasing. I *write* this, as I *think* and *feel* it, with grief and sorrow, for my love of the beasts and birds and creeping things of the earth is second to that of few others, but it is my conviction, and therefore I believe that every direct legislative effort to turn or to stop the tide of human progress in favour of the lower creation is wrong in principle, and will surely fail in practice. But were it right in principle, or if in spite of the principle I have mentioned, any attempt be made to legislate further on this subject, let the legislation be—as Mr. Morris has very forcibly argued—*thorough*; protect the beautiful magpie, jay, hawk and falcon; let the selfishness of game-preservers give way a little, so that these may live; and especially, I would add, let it be *just* also; do not deprive the bird-catcher of his hard earnings while you let the cruel and ignorant gamekeeper (as I have proof ready of a gamekeeper here doing very lately, and as I believe is the common practice of gamekeepers) torture a wounded jay for hours together, so that its shrieks may bring others within gunshot. Six jays fell here in this way in one day about a month since. Surely such a proceeding ought to come under the powers of the Humane Society. I fear, however, it does not, because cruelty can, as I understand, only be punished when wreaked upon some *domestic* animal; and if so, here is a point upon which legislation is certainly required. It may be absolutely necessary that magpies and jays should be exterminated in the interests of sport, but at all events let us regulate the mode of extermination, and enjoin at least decent humanity: this is imperative. Cruelty ought not to escape punishment one day longer merely because its object is undomesticated. Does a wild jay feel less than a caged chaffinch? Enforce humanity also among the bird-catching fraternity; but if birds are *not* to be caught, attack the evil in its stronghold—make it penal to have birds in cages at all. Do not let us be guilty of the worse than inconsistency of punishing the hungry man for catching for his livelihood that which you allow the full one to appropriate with impunity for his amusement when caught. If there is to be further legislation, let it be, I repeat, *thorough*: let it be penal to destroy *any* bird in its breeding-season: extend *this* protection to *all* our birds, but with care rigorously to enforce humanity, by the punishment of *all* cruelty. The gamekeeper must then be left to deal, *in the proper season*, with hawks, jays and magpies for sake of sport; the birdcatcher with linnets and goldfinches for his livelihood; and the gardener with *bullfinches* for the sake of his fruit,—for whatever, according to Mr. F. O. Morris, lately, in the ‘Times,’ may be the nature and habits of the *Yorkshire* bullfinch, the practice of the *Dorsetshire* bullfinch is utterly incompatible with either gooseberries, pears, plums, cherries, and some kinds of apple, and even (this year) peaches, nectarines and apricots. I say make a *close time* for *all* birds, and *enforce humanity towards all*. If, however, a close time for *all*

cannot be *practically* carried out (which will, I fear, be found to be the case), it never *will* be, I think, for the *few*; still less will it be effected by such an ignorant, blundering piece of legislation as the present Act proves itself to be.—*O. P. Cambridge; Bloxworth Rectory, May 19, 1873.*

Natural-History Notes from Coquimbo.—"The bay is well sheltered and almost land-locked. A ridge of sandhills runs along the top of the beach, and on this numerous queer Cacti and other plants flourish; between this ridge and the foot of the slope of the Cordilleras, a distance of about a mile and a half, runs a low flat piece of very marshy ground. This extends all the way from Coquimbo to Serana and probably beyond, and is therefore some twelve or fourteen miles long. The slopes beyond are perfectly dry and arid, but the water which causes this marsh gushes out in strong springs at their base. This is evidently percolation from the Cordilleras. The sandy slopes are the homes of innumerable burrowing owls, the quaintest-looking little creatures I ever clapped eyes on. Very tame they are, too, as one approaches their dwellings. They first of all stare vacantly with one eye; then, as one gets nearer, both eyes are opened, the stare waxes into a frown, as much as to say, "Where may *you* be coming to?" This having no effect, a gentle hiss is resorted to with a like result; then Mr. Owl becomes very fierce, his feathers are puffed out with rage, his eyes gleam maliciously, and he retreats slowly and backwardly towards his burrow, keeping up an incessant volley of hisses. On arriving at the entrance of his house he remains there, and does not retreat any further unless hard pressed. Altogether these are most interesting little birds, and I could not have the heart to shoot one. A brown description of Chinchilla lives in company with them. These birds feed, I fancy, on lizards and different kinds of crickets. I wish you could see a colony, you would have a rare laugh at the fussy little inhabitants. I went out shooting one day on the marsh. Almost the whole of it looked snipy ground, but a fatiguing beat only produced two snipes, both of which I luckily bagged. Here and there were large shallow lagoons fringed with a thick growth of bulrushes and reeds, and from them I shot two waterhens, a coot, and rail, all different from European birds. The coot's bill and bare patch at base were pale yellow, edged with pink, his legs greenish yellow. If I had had a dog I might have got numbers of these. From one of the lagoons I flushed a stilt plover, but it was out of shot; over another a scissors-bill was flying to and fro feeding. This last is a strange bird to look at. He flies close over the surface of the water, with the lower mandible immersed, and incessantly snaps the upper one against it, and was catching small insects probably. In body the bird is shaped like a tern, and when fishing flies much like one. Among the reeds were many sorts of warblers, buntings, red- and yellow-winged starlings, and a variety of other birds. In the bay brown pelicans are numerous, also a large and pretty tern. The former are the ugliest and most clumsy-looking creatures I ever saw. They sit in flocks

on the water, with their necks thrust back on their backs and bills resting on their breasts; and their feathers, as a rule, are ruffled, jagged and untidy.”—*G. F. Mathew; H.M.S. ‘Repulse,’ Coquimbo, February 28, 1873.*

Cuckoo’s Egg.—Seeing that there is so much controversy respecting the colouring of the egg of the common cuckoo, I wish to state that out of the very many that I have seen, I have never met with any specimens which materially differ in the colouring; in fact, with the exception of one, which has a reddish tinge, the only difference I have observed is that some are darker than others. I do not believe that the cuckoo sucks the eggs of other birds, but I do believe that it sometimes carries its own egg in its mouth, and that, at all events, it in some cases deposits its egg from its mouth in the nest of other birds. I have on more than one occasion found the egg of the cuckoo in a nest placed in such a situation as the bird could by no possibility have reached to lay its egg as other birds do. On two occasions I have shot a cuckoo and found a broken egg *of its own*—broken, no doubt, by the fall—in the bird’s mouth; and, in another case, I picked up a perfect cuckoo’s egg lying by the side of a cuckoo I had shot; of course I cannot say that it came from its mouth.—*W. Borrer; Cowfold, Sussex, May 6, 1873.*

The Cuckoo.—I have read with much interest Mr. Newton’s article on the eggs of the cuckoo, as republished in the ‘Zoologist’ (S. S. 3505): he remarks in conclusion, “Hence I am not afraid of hazarding the supposition that the habit of laying a particular style of egg is likely to become hereditary in the cuckoo.” Now I do not see why the presumed habit should be more likely to be hereditary in the cuckoo than in any other species. Mr. Newton, it is true, cites an instance or two of there having been a family likeness found between the eggs laid by the same bird, so that they could be readily distinguished from others; but these rare—not to say accidental—varieties in the colouring of eggs may arise from different causes,—for instance, the age of the bird or defective organization. The eggs of many birds are found to vary more or less in colour,—those of the common house sparrow, for instance,—though I know of no regular or permanent varieties in any species. Mr. Doubleday states that the eggs of the cuckoo probably vary less than those of any other British bird; and Mr. Hewitson, who should know something of British birds’ eggs, says that the eggs of the cuckoo are “invariably gray or grayish brown, irrorated throughout with darker brown, and marked by minute black spots.” He found six out of seven cuckoos laying—*i. e.* depositing—their eggs in the nest of the hedgesparrow. This, to my mind, is conclusive evidence, and settles the question with regard to selection, for unless as “blind as a buzzard,” she could not, with respect to the colour of the eggs, make a worse choice. On seeing Mr. Newton’s request (Zool. S. S. 3473) that it should be ascertained whether the hedgesparrow has any objection to foster eggs of a colour entirely different to its own, I looked out for a nest, and found one in the garden on the 9th of April, apparently

finished, though without eggs : it was placed in a stunted privet-bush, almost leafless. On the 11th the first egg was laid ; another on the 12th, when one was taken and a robin's egg substituted ; on the 13th the hedgesparrow was on the nest, but suddenly quitted it on seeing me ; the robin's egg was there safe and sound, and another hedgesparrow's egg beside it. Owing to absence from home, the nest was not again inspected until the 23rd, when the old bird was found on it, and I had to brush past to get her off ; the robin's egg was lying between the two blue ones, with which it contrasted most strongly. Did not disturb her on the 24th, the eleventh day (which, according to Mr. Morris, is the time of incubation), the weather being unseasonably cold ; thermometer 44° at 9 A. M., with a sprinkling of snow. On the 25th, at noon, found a newly-hatched bird lying motionless at the bottom of the nest, its head hanging down ; at 3 P. M. the nestling was sitting with upraised head and open mouth : the other egg was perforated, though the aperture was but slight ; the robin's egg unchanged. By midday of the 26th the second chick had quitted the shell and was endeavouring to stand, but the robin's egg proved a stumbling-block ; and there is now reason to fear that it will not be hatched, the old bird having to leave the nest in quest of food.—*Henry Hadfield ; Ventnor, Isle of Wight, May 7, 1873.*

Note on the Waterhen.—The following circumstance was recently related to me by an eye-witness, and though it did not happen this year I think it worthy to be recorded. In the moat attached to Ashwellthorpe Hall, in Norfolk, there reside certain waterhens, which, not being disturbed and being frequently fed with bread thrown into the water, have become very tame. A pair of these birds hatched two successive broods of young during the same spring, and soon after the second brood was hatched the young birds of the previous brood were observed to pick up the crumbs of bread which were thrown on the water, and to feed with these crumbs, the younger chicks of the second brood.—*J. H. Gurney ; April 25, 1873.*

White Stork in Suffolk.—For the last day or two we have had a rare visitor in our marshes, in the shape of a white stork (*Ciconia alba*) : he is a most conspicuous object, and may be seen from a great distance. We watched him yesterday (May 21st) for a long time, with a good glass : he appears to be in good plumage, and is very wary, not allowing us to get at all near him. When flying he was followed and mobbed by some peewits, which evidently looked upon him as a most unwelcome intruder. As there happened to be a heron on the wing nearly at the same time, we had a good opportunity of comparing the flight of the two birds : the stork looked the larger bird of the two, and his wings appeared to be longer and less rounded than those of the heron : the different manner of carrying the head was also very striking ; it was poked out in front of the bird, but not stretched out so straight as that of a swan in flying.—*G. T. Rope ; Leiston, Suffolk.*

A Difficulty for Darwinists. By FRANCIS HANCOCK BALKWILL.

THE third chapter of Mivart's 'Genesis of Species' states a difficulty to the acceptance of Darwin's theory of the origin of species thus:—"On this theory the chances are almost infinitely great against the independent accidental occurrence and preservation of two similar series of minute variations resulting in the independent development of two closely similar forms." Amongst other illustrations of his theory, he mentions that Professor Huxley had called his attention to the very striking resemblance between certain teeth of the dog and the Thylacine. Having had this difficulty very strongly forced upon my own mind in studying mammalian teeth, I will try and state it more fully than is done by Mivart.

There are certain highly specialized and complicated organs found upon different animals, which are so similar that, upon Darwin's theory, they ought to be hereditarily descended from or related to each other; and yet, by the same theory, it seems almost possible to prove that such could not be the case. Now if this proof does hold good, some very considerable modifications of the theory will be necessary.

It is a fact familiar to every child that there are many kinds of animals differing from one another in their general characters, and that some of these animals are more alike than others, so that a rough common sense classification soon takes place in the mind of every individual, by which all the animals they are most familiar with are probably arranged according to the peculiar conditions of that individual. A settler in a new and wild country might have two sub-kingdoms, *viz.* Wild and Domestic, of which the wild might be divided thus:—

Dangerous to human life;
Noxious, but not dangerous;
Injurious to crops;
Useful for food;
Furnishing useful furs or skins;

and so forth. It would soon be observed that there were many animals so similar in appearance that they might easily be mistaken for each other, and that these similar animals had a similarity of

habits, that their offspring resembled them, and that there was a community of blood-relationship between them. Thus a rough idea of species is arrived at; but when scientific men have tried to define the limits of these different species there has arisen the greatest difficulty, each definition generally depending upon what the arranger really believed to be the origin of species, and therefore impossible to be used in discussing the origin of species without begging the question.

Now as a merely useful word, and not a dogmatic one, I think "species" may be used in two ways; the first, I suppose, would be the logical one, that it was the lowest or simplest unit of generalization—*i. e.* that all animals so nearly alike that they cannot conveniently be divided into smaller groups should be considered as belonging to the same species. The second requires a little elucidation: all animals between which there is a community of blood amalgamation are not exactly alike, although more or less similar, and minor differences amongst animals having such community are sometimes capable of generalization; still this blood-relationship seems to be the central fact around which all affinities of form, habit, or character group themselves; and there is no dispute or doubt at all that where a certain amount of divergence in these affinities or resemblances is found, there is no longer any possibility of amalgamation.

Now a definition framed on this fact will suit very well for the purposes of this discussion, and is included in the first explanation. That is, the simplest unit of generalization is that all those animals amongst whom there is the possibility of blood amalgamation shall be considered to be of the same species, and where there is no such possibility then such animals are to be considered as belonging to different species.

It is to be distinctly understood I do not in any way wish to beg the question as to whether this is a correct definition of the term species, when used zoologically: that would be settling the whole matter at once. But that as every one, orthodox naturalists, Darwinists, or common-sense observers, are all agreed in the fact that there is such a limit, I take that limit for convenience as the definition of the word as I use it here.

The number of different species of animals in the world is immense, infinite, to the ordinary mind, and it might occur on first thoughts that however these different forms of life originated they

must be capable of some classification by their resemblances; but a very slight acquaintance with the science of Zoology forces upon us a conviction that a classification is possible which shall express more than this.

Vast numbers of these species consist of animals of infinite complexity of organization, and the resemblances and affinities of construction of many of the organs belonging to animals of different species are so interlinked and graduated as to suggest irresistibly some mysterious continuity between them. The permanence of animal life is provided for amongst each species in its community as specified by our definition, by the reproduction of young, which generally develop into animals like their parents, although in some of the lower forms it takes two or three generations for the return to the same form. All animals can be so arranged, according to their organic structures and most essential characters, as to form a sort of genealogical tree.

Three theories are tolerably widely accepted to account for the classification by scale of development and affinity of construction of which animals are capable; one is that they were created in general harmony of idea, to educate the soul of man; another, that of Darwin, supposes that there were but few of the simplest forms which first had life breathed into them by the Creator, that all the rest have been developed by a severe competition amongst these forms, which in reproduction continually varied slightly, that in this severe struggle for existence the best forms survived, and gradually the higher types of life were thus developed, without any further interference of any other power. The third view is held by those who are not satisfied with the first-mentioned opinion, inasmuch perhaps as the width of creation coming so little within the view of the majority of mankind, it seems rather a presumptuous and inadequate idea to suppose that this infinity of gradation was made for the education of men, so few of whom could ever see its meaning. These persons also doubt the power of the second principle to be capable of surmounting all the difficulties of organic construction, or of producing the originality, beauty, or sensibility which is actually found in the organic world: they are rather inclined to believe that they behold the real steps of evolution, invention, and creation, by which not only is man to be educated, but by which he was invented and created (if these two words should not indeed stand for the same act).

According to this last theory, whether there has been or has not been a material continuity between the lower and higher types, might be open to discussion; the main difference between it and Darwin's theory is, that it maintains that a material continuity is not necessary, and that the mere laws of necessity (granted a low type of life) and the general conditions of the world are not sufficient to account for that classification of the organic world, which is possible, but that an ideal bond of unity of design is plainly indicated. Whereas Darwin maintains that the bond of unity has been material continuity, produced entirely by the action of the general laws of this planet upon an original simple form of life. Here are Mr. Darwin's views in his own words:—

“As each species tends by its geometrical ratio of reproduction to increase inordinately in number, and as the modified descendants of each species will be enabled to increase by so much the more as they become diversified in habits and structure, so as to be enabled to seize on many and widely different places in the economy of Nature, there will be a constant tendency in natural selection to preserve the most divergent offspring of any one species. Hence during a long-continued course of modification the slight differences characteristic of varieties of the same species tend to be augmented into the greater differences characteristic of species of the same genus. New and improved varieties will inevitably supplant and exterminate the older, less improved and intermediate varieties, and thus species are rendered to a large extent defined and distinct objects. Dominant species belonging to the larger groups tend to give birth to new and dominant forms, so that each large group tends to become still larger, and at the same time more divergent in character. But as all groups cannot thus succeed in increasing in size, for the world would not hold them, the more dominant groups beat the less dominant. This tendency in the large groups to go on increasing in size and diverging in character, together with the almost inevitable contingency of much extinction, explains the arrangement of all the forms of life in groups subordinate to groups, all within a few great classes which we now see everywhere around us, and which has prevailed throughout all time. This grand fact of the grouping of all organic beings seems to me utterly inexplicable on the theory of creation.”

Now if this grouping has been the result of hereditary connection, how does Darwin account for similar or homologous organs having an independent source?

This is the case in point. The marsupial Mammalia form a natural order. No naturalists have ever attempted to separate

them in classification, and the fact of their being almost exclusively found in Australia (only one genus, that of the true Opossums, being found elsewhere, in North and South America), gives us all the more confidence in regarding them as such. At the same time this isolation tells very well in favour of Mr. Darwin's theory. The marsupial is a very early type of mammal, and was at one time much more widely distributed than at present. Prof. Owen figures the lower jaw of a small insect-eating marsupial taken from the Stonesfield oolite in Oxfordshire, England. Now if the placental type, which is a higher and prevailing one, had arisen from one species of marsupials, it would, if the advance was of sufficient importance, have gradually supplanted the lower type, wherever it came into competition with it, and we have only to allow that this struggle did not first occur in Australia, and that all communication with the rest of the world was cut off before the predominating race could reach Australia, and we should expect to find, according to Mr. Darwin, exactly what we do find; all the animals there retaining a distinct classification group around the old marsupial type. I wish to make this point very clear and strong, for the clearer and stronger it is the greater the difficulty will be for Mr. Darwin's theory a little further on.

The sheet-anchor of Darwinism is, that the adaptations of organs to the needs of the animal are not produced by external circumstances, but that out of the infinite slight variations which arise the one which gives its possessor the advantage in the "struggle for existence" prevails, the less excellent dies out.

Out of the infinite possibilities for improvement which surround any animal, it would be extremely improbable that the same should be arrived at by different species, and *a fortiori* when this improvement consists of organs exceedingly complicated and apparently difficult of development.

Let any one consider the wing of a bird, a fly, or a bat, and he will understand what I mean: if we only knew of one organ of flight we might be led to suppose that it was the only mechanical contrivance possible to this end, and yet we see in these instances how entirely distinct are the means to the same action. How rational and in accordance with *a priori* reasonings it seems to be, that bones should be within the body to support the soft parts and give them by leverage the means of determinate motion; and yet when we compare invertebrate with vertebrate animals it shows us

that we may allow infinite scope for variety of plan. Mr. Darwin has referred to the growth and affinities of language in illustration of the growth and affinities of species: it will bring it home to us, and may be not much overstraining the case, if I say that to expect to find the same organization developed from similar external conditions, on Mr. Darwin's hypothesis, will be a parallel case to expecting to find the same language evolved from two originally distinct people who had no communication, because their external conditions were similar. Imagine the European discoverers of Japan finding the natives speaking a European language, or one so near it as readily to be understood by them. Would they not find it very difficult to believe in an independent origin for that language? Just so, then, we ought to find an absence of placental animals in Australia, if it was separated from the rest of the world before that type was introduced. So far the illustration is entirely against us.

But let us look at this order of marsupial Mammalia a little more closely, and see of what divisions it is composed. We have the familiar kangaroos, which take the place in the Australian fauna that the lighter ruminants—antelopes, goats, sheep and deer—do in the larger continents, browsing on the herbage of the plains or amongst the rocks during the dusk, and lying hid in the light daytime. Here is the same place in nature filled by how different and original a type. Then we have the wombat: this animal is to all intents and purposes a rodent; its four front teeth possess a persistent pulp continually growing forwards on the arc of a circle as they wear away in front, with a strong plate of enamel arming their front surfaces, so as to keep this sharp by the greater wear of the softer tissues. Behind, the body of the tooth, consisting of dentine, is surrounded on its surface by a layer of *cementum* or bone substance. These incisors are separated from the grinders by a wide space unoccupied by any teeth. The same arrangement may be seen by any one who will take the trouble to examine the skull of a rat or guinea pig; a rabbit or hare differs in having four instead of two upper front teeth. But it is possible that the placental type may, in the first instance, have branched off from a marsupial rodent. Mr. Darwin himself draws attention to the affinity exhibited by the viscacha, a rodent of South America, something like a hare in general appearance.

I have constructed a genealogical tree of the principal divisions of

Mammalia, hypothetically connecting the marsupial and placental divisions by the rodents, through this affinity of the wombat for them. According to natural selection, as I understand it, we should expect to find such a connecting link, and this evidence at any rate is not antagonistic to the theory.

But what is to be said about the *Thylacinus*, the hyena or tiger of the settlers in Van Dieman's Land, a predacious marsupial, the size of a large dog, whose skull is so very similar to that of a dog that a naturalist need be well up in his subject to be able to distinguish it from a dog's if he were to find it lying about on an English common?

The dog has six insignificant incisors above and below; *Thylacinus* eight above and six below. The dog has two large curved conical canines above and below; *Thylacinus* precisely similar ones: the lower canines, in both cases, close in front of the upper, although the lower incisors close behind the upper. Next behind the canines in both animals a row of spear-headed teeth are placed to help to hold a struggling prey. The molars of the marsupial, six in each jaw, are formed for cutting flesh and breaking small bones; two of the teeth in each jaw of the dog are similarly formed; four posterior ones above and below being tubercular grinders, more adapted for crushing than cutting. The homologies of their respective dental formula are:—

THYLACINUS.

	Incisor.	Canine.	Premolars.	Molars.			
Above . .	$\frac{8}{}$	$\frac{2}{}$	$\frac{6}{}$	$\frac{8}{}$	=	$\frac{24}{}$	= 46
Below . .	$\frac{6}{}$	$\frac{2}{}$	$\frac{6}{}$	$\frac{8}{}$	=	$\frac{22}{}$	

DOG.

	Incisor.	Canine.	Premolars.	Molars.			
Above . .	$\frac{6}{}$	$\frac{2}{}$	$\frac{8}{}$	$\frac{4}{}$	=	$\frac{20}{}$	= 42
Below . .	$\frac{6}{}$	$\frac{2}{}$	$\frac{8}{}$	$\frac{6}{}$	=	$\frac{22}{}$	

Any one who will compare the skulls of the badger or seal with that of the dog cannot fail to be struck with the much greater dissimilarity they exhibit than do the two skulls we have been considering; yet both these animals are indubitably classed with the dog in the same order of Carnivora, far removed from the marsupials. Some naturalists, led no doubt by this fact, classed marsupials as a suborder of Carnivora, but in that case we should only reverse the difficulty by having to account for the homologies of the wombat with the higher rodents.

There is a solution which may perhaps be offered, that the higher rodents and Carnivora arose on parallel lines from the marsupial rodents and Carnivora; but in that case it will give the same difficulty in another form, for it will admit that the placental type had arisen from at least two separate origins, which, according to our previous argument, is infinitely improbable.

The more I ponder the subject the more I am convinced that the difficulty is no mere quibble. To look at the three skulls, of a *Thylacinus*, a dog and a seal, and to consider that by any possible genealogy the dog is more nearly related to the seal than to the *Thylacinus*, and in fact that before the relationship between the dog and marsupial can be traced every sign of a carnivorous animal must have been lost and reproduced, presses it strongly upon my mind that there is some force at work unaccounted for by the theory of the evolution of species in their struggle for existence.

Let us review the complexity and apparent difficulty of the evolution of teeth in such definite form and arrangement as those I have been describing. I say *apparent* difficulty, because in making researches the student can hardly fail to be impressed with a feeling as if ages upon ages had been spent, and myriads of forms evolved for every little step in advance.

I will try and give a general outline of what seems to have been the path of the evolution of teeth, as a great deal of the strength of my argument is based upon the very high type of organization which they evince.

We do not find that teeth maintain any important place in the animal economy until we arrive at the subkingdom Vertebrata. There are a few curious examples among the lower forms, as in *Echinus*, the leech, and amongst mollusks; but it is amongst animals possessing a bony skeleton that teeth are met with in endless variety of form, structure and arrangement. Amongst the lowest vertebrates (fishes), we find, as we should expect, the lowest types of teeth, some of which seem to consist of a tissue scarcely varying from bone in structure, so that it may be well to say a few words about bone itself as illustrative of our subject.

The essential requisites of bone seem to be, that it shall possess a certain amount of mechanical strength and hardness, in order to support the soft parts and provide them with rigid bars to be used as motile levers; also that it shall be capable of such change of

shape, as the general growth of the animal requires, that this last process may take place: bone is occupied throughout its substance by small hollow spaces, technically termed *lacunæ*, which communicate with each other and with the nearest vascular surface by means of very fine tubes termed *canaliculi*: these lacunæ and their canaliculi are occupied by soft living cells which seem to possess the power of building up or taking down whatever is required.

Little animalcules (Foraminiferæ by name) have the power of secreting small shells around them, leaving fine holes all over the shells through which to pass fine processes of their bodies, which only consist of a little jelly-like protein. We may look upon each of these cells occupying the lacunæ of bone as so many Foraminiferæ which have lost their individuality, and have had implanted in them a sort of instinct, or habit, of building up around them, or pulling down, or merely keeping in repair, just what is required by the physiological well-being of the animal. Like a colony of bees, always hard at work attending to their duty. In order to provide them with requisite food, bone of any thickness is traversed by vascular canals, called Haversian canals, which give fresh bone its pink colour, and the blood-vessels within which, bring the food and take away the *débris* as required. Around these canals the cells group themselves, communicating with them by the canaliculi.

The problem to be solved in the construction of teeth is rather different from that of bone. Here part of the organ has to resist more or less severe direct mechanical friction, has to be exposed, and at the same time maintain a strong connection with the living and sensitive body. One of the first distinctions between tooth-substance and bone seems to be in the elimination of the requisites for pulling down and rebuilding. No normal tooth that I am aware of alters its shape after formation. The calcigerous or bone-forming cells retire to the circumference of the space around each vascular canal, and dwindle in size until they disappear, or they retire into the vascular canal and remain there as a persistent calcigerous pulp. The fine canaliculi, around which the salts of lime which harden the tooth were deposited, remain. Professor Owen mentions having observed the tooth of a fish composed only of this structure, which he calls vaso-dentine; an advance upon this vaso-dentine is made by the whole exposed part of the tooth being protected by a layer of the calcified tissue traversed by canaliculi,

but possessing neither lacunæ nor vascular canals. This is a very common form amongst fishes.

In the common wrasse or connor of our shores we find this harder external layer developed inwards, to the extinction of all the vaso-dentine. The tooth is entirely composed of hard, very finely tubular dentine, but this construction seems to interfere with the vital connection of the tooth with the living jaw, as there is a provision for a constant succession of teeth from below.

Indeed in fishes generally there seem to be few examples of teeth being implanted by fangs in a socket, and also there seems to be no great permanency of connection between the teeth and their possessors: there is generally a provision for a constant succession either from behind forwards, as in the sharks and rays, or from below upwards, as in the wrasse, already mentioned, or as in the angler, where they rise up between the old ones, which fall away. The law seems to be that of irrelative repetition. There is no instance amongst fishes of such a continuously growing tooth as we find in the wombat, which if it were a probable structure to occur from separate origins we might expect, since there is much greater variety of form and number of species for it to occur in among fishes than mammals. The dental apparatus of the parrot-fish is one of the nearest examples to the teeth of rodents in function that I can find; that of the *Lepidosiren* looks something like in section, but I do not know sufficient of the habits of this animal to say anything of the functions of its curious-looking jaw. Amongst reptiles the same law of constant succession of teeth holds good, which looks as if there was the same difficulty of retaining the teeth permanently, but when we arrive at Mammalia we find at most only one change of teeth, and this apparently in order to accommodate the adult animal with a larger set than would have been convenient for its young state.

The peculiarities of structure which perform this apparently difficult feat are these:—the part of the tooth most exposed to wear is protected by enamel, which is extremely hard, and, so far as we know, entirely devoid of life; below this, and immediately surrounding a single vascular permanent calcigerous pulp, is the body of the tooth, formed of dentine, which is traversed by an immense number of fine tubes passing from the pulp to the circumference. These tubes being occupied by fine processes of the calcigerous cells, which, as we have before seen in the development

of teeth amongst fishes, have retreated into the vascular pulp. Around the outside of such part of the dentine as is not covered by enamel there is a layer of bone-substance containing plenty of calcigerous cells: this layer is called the *cementum*. This *cementum* surrounds the fang in those teeth which are thus attached to the jaw, and no doubt, by its highly vital character, plays an important part in maintaining the life of the tooth, and by its plastic nature perhaps helps to accommodate the fitting of fang and socket together.

We see, then, that teeth such as those found in the dog, thylacine, wombats and rodents, are organs of an exceedingly high order of organic construction, and that there is an exceedingly close resemblance between them respectively, *i.e.* between thylacines and dogs, between wombats and some rodents. How can this be reconciled by Darwinists with their theory?

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13, Princess Square, Plymouth.

Large Squid exhibited in Japan. By H. PRYER, Esq.

Communicated by Percy C. Wormald, Esq.

A FEW days ago, hearing from a friend that the Japanese were exhibiting an immense cuttle-fish, I despatched my boy to make enquiries. Hearing from him that it was really a wonderful thing, and worth going to see, I put a foot-rule in my pocket and started off for the place. I have been once or twice deceived by accounts of extraordinary beasts being exhibited in the native town. Some little time ago several Japanese came and told me that there was a strange animal on exhibition, so strange that they could not even describe it or make a drawing of it. Upon examination it proved to be a rather undersized porcupine, which they had imported, they said, from France; but I expect it came from America, France and America being pretty much the same, from a Japanese point of view: they are all “ketoisars,” *i.e.* hairy fools from far countries. So this time I went without any very great expectations, though rumour made the cuttle-fish twenty-two feet long, and I should not have been surprised to find it only two feet or thereabouts.

The Japanese placard or handbill consisted of a rough sketch of the cuttle-fish and the following in Japanese characters:—“This

large squid was caught off the sea-coast of Kessarradzu, in Kadzuzar. It is fifty feet long, and often harassed the fishermen's boats, drawing them down by its strength. From the olden times until now there has never been seen such a curious thing; therefore come and see it during the next twenty-three days: it is in an enclosure in Hangoro Morcho Benten. Come and see it."

On nearing the place, which was a straw booth erected within a temple's ground, called Bentensama (the usual place for wrestling and other exhibitions), the front ornamented with a representation of the creature having a grand battle with a number of fishermen in boats, and, strange to say, the picture proved to be smaller than the reality. Perceiving a very strong smell of bad fish, I lighted a cigar, and after paying the sum of two tempoes (three half-pence), I entered, and was truly astonished at the sight. The following are the dimensions:—eight feet from root of arms to the end of the body (body six feet, head two feet); four feet in width at the broadest part; six feet the length of the longest pair of arms (of which there are five pairs); eight inches the diameter of the eyes. Of the upper mandible of the beak three inches and of the lower some four inches were exposed to view, the remainder being retracted within the head. The arms, which were much shrivelled, were about as thick as a man's arm, and had a quantity of suckers attached to them. I would have counted the number on one arm, but many of them had been detached and taken away by the Japanese visitors. I obtained one: the extremity is shaped like a cup, and is formed by a ring of shell toothed like a saw, and is nearly an inch in diameter.

I am endeavouring, but I am afraid unsuccessfully, to buy the beak, but the owner demands twenty-five dollars for it. I may, however, obtain it yet, if no one else offers for it. I inquired if it had a back-bone similar to what the small squids have; but they informed me that this species never has one, and that there was only a thin, brittle, glass-like substance, of the shape of a bamboo-leaf, running half the length of the body, so I presume this is one of the cuttles that produces the sea-pen. They had destroyed it in cleaning out the inside.

They also told me that they had a great sea fight with the creature when they made the capture; but this I do not believe, as I have frequently observed the smaller species swimming about the bay, and when frightened they can dart away out of sight in

an instant, much quicker than a boat could be propelled. I expect that it had been picked up dead on the shore.

I inclose a paper which one of the showmen handed to me, the translation of which I have given above. It has an illustration of the "kraken," which gives a very good idea of its shape. They said this was a full-sized one, and that they had never seen one larger, and also that it was very rare, which was corroborated by several of my Japanese friends, who have seen these huge things before, but none so large as the present specimen.

H. PRYER.

Yokohama, March 24, 1873.

[There is little doubt that the Japanese figure is intended to represent a true squid, but of unusual magnitude: those which occur in European seas are generally less than a foot in length. We are very much in want of exact admeasurements such as Mr. Pryer has so kindly supplied; they correct not only the exaggerated accounts of enormous cuttles, but equally exhibit the folly of discrediting them altogether.—*E. Newman.*]

A Visit to Corsica. By the Rev. F. A. WALKER, M.A., F.L.S.

(Concluded from Zool. S. S. 3556).

October 29. A large rust-coloured hawk was wheeling in circles above the glen that forms the bed of this stream, whose waters are now conveyed to the capital by means of an aqueduct of many arches, a work involving considerable time and expense. For some distance before reaching the town, which is approached through an avenue of trees, the bay of Ajaccio is dotted with straggling dwellings around its beautiful shores, and Capo Muro stretches away in a long projecting point to its south-west extremity. An amphitheatre of hills overlooks this extensive bay, which appears from some points of view like a land-locked lake. The first stroll I took at Ajaccio on my arrival on the afternoon of the 29th was to leave the Cours Grandval by what are called the "Four Cottages" in the new English quarter, and so past the soldiers' exercising-ground, as far as the Grotto of Napoleon, composed of four or five gigantic boulders embowered in olives and Cacti, and duly scribbled over. It was here that the young cadet is reputed to have spent his leisure time in meditation, and a prettier, more retired spot could scarcely be chosen, even on these

picturesque hill-sides, overlooking the sparkling waters of the bay. I came across *Ædipoda cærulans*, for the first time, on this occasion, a species akin to the blue variety of *Æ. germanica* in appearance, but its upper wing is a lighter brown, while its lower, in addition to having no black margin, has a paler and more of a lavender tint.

October 30. The weather during our stay here continued almost uniformly cloudless and very hot, the thermometer averaging from 90° to 100° in the sun, and the granite rock of the neighbourhood, in many places in a state of disintegration, afforded a warm surface for vegetation, whose growth was correspondingly luxuriant, as well as for lizards to bask in and course over. My list of captures this day included *Daplidice*, *Satyrus Tigelius*, and *Ædipoda cærulans*. *Chrysomela Banksii*, *Edusa*, and *Acridium tataricum* were abundant, and both red and blue-winged *Ædipoda* met with, of which the former were of very small size. My walk again led me to Napoleon's Grotto, and on proceeding further into the macchie, amid the olive- and cactus-clad heights, I observed a large dark butterfly flying overhead, whose species, whether *Charaxes Jasius* or one of the largest *Satyrids*, I was unable to determine. Received a present of a fine spray of the *Smilax mauritanica*, or sarsaparilla plant, which I had previously met with at Bastia, a handsome creeper, whose flowers grow in a thick cluster, and are of a brownish white.

October 31. Respecting marine productions I ascertained nothing, or at all events very little. My sole success lay in a visit that I paid this morning to the beach below Fort Aspret, where, amid numerous fragmentary conchological remains, I picked up a few ounces, cowries, &c., and two or three sponges and coral-lines from the rocks. A message to the fishermen failed of effect, probably because, as I afterwards learned, the coral fishery lay not in that quarter, but at, or at all events near to, Bonifacio. Following the road that, at the distance of a quarter of a mile from Ajaccio, I turned up the hill between two deep cuttings to the right, and visited the Greek chapel, built precisely in the fashion of an ancient temple, with approach by flight of steps and peristyle. Daisies grew abundantly in its immediate vicinity, but though nearly all were "with crimson crest," they by no means proved "a little flower," as they rivalled ox-eyed daisies in size, and had

stems a foot in length. I was disappointed of the sight of a collection of insects this afternoon that were formerly preserved in an educational institution, but removed lately, I was informed, by one of the brothers, to France. However, I inspected the birds and antiquities presented by Prince Lucien Buonaparte to the "petit seminaire," and some minerals and shells of Corsica, the donation of an "eveque" to the same establishment.

November 1. I went along the shore by the coast road, where, in addition to the enjoyment of beautiful views of the bay, I found *Statice articulata* displaying its small lilac flowers and heath-like bracts just above the beach, and, by far the prettiest of all, the tiny *Leucojum roseum*, a species of snowdrop peculiar to Corsica, whose pinkish white blossoms exhale a delicate perfume. I never saw this exquisitely lovely little flower except on the short sea-turf at intervals along this road, where it blossomed in great profusion. Respecting the butterfly *par excellence* of Corsica, *Papilio Hospiton*, once, and once only, did I see it on a bank of crumbling granite close to the shore this morning, where it settled, with its wings flapping, not sufficiently near for me to make a cast with the net before it rose again and was seen no more, but still I could discern that its markings were darker, and slightly differing from the ordinary type of *Machaon*. The afternoon was occupied in visiting the chief sight of Ajaccio, the birthplace of the first Napoleon, as well as the villa of the Comte Bacciocchi, chamberlain to the third of the name, where the garden contained a variety of flowers, *Daturas* nine inches in length, and large bushes of *Heliotrope*. We then proceeded further in a southerly direction, and Campo d'Oro and the old harbour were the last places we surveyed.

November 2. Along the coast road again, where I gathered *Scilla autumnalis* and a blue *Echium*, besides capturing *Conops aculeata*, *Ammophila holosericea*, and two undescribed species of *Pompilus*. *Edusa* and its pale variety *Helice*), *Æ. cærulans*, *Tryxalis nasuta*, *Daplidice* and *S. Tigelius* were seen. *Atalanta* and *Cardui* also occurred, the former fresh, the latter worn.

November 3. We walked along the shore in the afternoon, where we saw the Corsican snowdrop in all its beauty once more, a high wind meantime blowing with clouds of dust.

November 4. To-day we drove out to "Les Iles Sanguinaires," distant about ten miles from Ajaccio, at the north-west extremity

of the bay, which terminates in a fine headland crowned by a ruined watch-tower, probably erected by the Genoese of old time, with two rusty cannons lying on the side towards the sea; and returning on foot from this promontory found numerous Coleoptera either crawling on our path or humming past us as the sun set upon our evening walk and the beacon began to twinkle seaward from the lighthouse of the isle. *Geotrupes hypocrita* and *lævigatus* were among my captures that afternoon, before it grew completely dusk, causing the numerous sepulchral edifices along the shore to look white and ghostly in the moonlight. These private family vaults, ordinarily surmounted by domes, are the property of well-to-do Corsicans, and stand in their own little enclosures, with two or three olives or cypresses planted around. This custom arises from a feeling of respectability and decency, owing to the disgraceful manner in which the funerals of the lower class are ordinarily conducted at the neglected public cemetery.

November 5. I took *Polistes gallicus* and a second specimen of the *Mantis religiosa* on the wall of a house, having captured the first on a warm bank on the morning of the 1st of November. It is said to abound in gardens here in the summer time, and is essentially a flabby, debilitated and sluggish insect, exhibiting none of the muscular power and swiftness of movement which locusts and the larger grasshoppers possess.

November 6. This day, as well as the preceding, I visited M. Kozirowicz's fine collection of European Coleoptera, including many rarities either peculiar to Corsica, or to that island and Sardinia. Several of the insects in question were taken by himself and named by M. Saulcy, of Metz. Corte, Vivario, Porto Vecchio, Bonifacio, Campo d'Oro, but especially the Forest of Vizzavona, were among the localities where he had been most successful: it was there that he had captured most rarities, more particularly the minute kinds that have their habitations in moss, "les petits aveugles," as he termed them, and with which he appeared to be greatly amused. I went with him into a small garden behind his office, where we took several specimens of *Chrysomela Americana* on lavender, and was also kindly presented by him with upwards of thirty species mostly peculiar to the island, as, for example:—

Acrisius Kozirowiczi
Cicindela connata

Drypta distincta
Bembidium Küsteri

Percus Reichei
Pselaphus Revelieri

Setaria sericea	Triodonta cribellata	Agapanthia insularis
Nebria Lareyniei	Attelabus atricornis	Lixus submaculatus
Brachycerus barbarus	Drypta emarginata	Dichillus Corsicus
Xanthochroa Raymondi	Reicheia palustris	Strophosomus Fagi
Agabus cephalotes	Bythinus Myrmido	Tachypus cornutus
Anthaxia Corsica	Tentyria ligurica	Lionychus Sturmi
Pterostichus ambiguus	Helops superbus	Phytonomus punctatus
Cionus distinctus	Asida carinata	Parmena Solieri
Trichius zonatus	Otiorhynchus Corsicus	Pachychila Servillei
Amaurops Corsicus	Hoplia pubicollis	Pimelia Fayrandi
Harpalus Bellieri	Percus Corsicus	Agabus binotatus

November 7. We took the *coupée* of the diligence on our return journey to Corte, but were delayed about an hour in starting in consequence of the non-arrival of the packet. Boco-guano, where the real ascent to the Foci commences, is a large old-fashioned village in two or three separate divisions: our appearance excited a good deal of curiosity as we walked on pending the change of horses. The church and the square campanile, so characteristic of this country, were slightly elevated on a rise above the road, and their bells were both ringing for vespers as we passed, occasionally looking back at the clear sky then bathed in the truly magnificent tints of a Corsican sunset. Evening was very cold in this elevated region, and the Forest of Vizzavona presented a weird-like appearance beneath the moon as we descended on the other side. Dining at Vivario we arrived late in the evening at Corte, seen along the numerous windings of the road long before reached, then up its steep suburb, the lights shining above on the scarped precipitous rock on which the citadel and part of the town, Acropolis-fashion, are erected.

November 8. Though celebrated in the political history of the island, and in spite of the delicious trout that are taken in its mountain streams, Corte has little to recommend it in itself. It is a dirty, ill-smelling place, several of its houses are six storeys in height, and its streets uneven, and the children wear a pallid and unhealthy appearance; but the adjacent scenery is fine, and the gorge of the Restonica, though less wild, is not at all unlike the opening of the Via Mala at Thusis. The day was intensely hot, and the atmosphere of the mountain valley confined, as we walked up the right bank of the stream, until descending to its bed, after a short distance, we arrived at two or three

apparently deserted mills, their marble steps broken and grass-grown, and a few Spanish chestnuts close by: specimens of gray and white-veined marble may be gathered here; and from the number of small green and copper-coloured Carabidæ (*Harpalus æneus*) I was enabled to collect under stones within the space of forty minutes in this spot, as well as other species,—including *Xantholinus glabratus*, *Calathus melanocephalus*, *Brachinus sclopeta*, *Sphæridium scarabæoides*, *Adimonia Tanaceti*, a species of *Cionus*, and *Oryctes Grypus* (in a torpid condition),—I should imagine this to be an excellent habitat for Coleoptera, and all that I heard of the locality, hill as well as dale, tends to lead me to the same conclusion. I also took *Gryllus ater* on this occasion, as well as the following Hemiptera:—*Pyrrhocoris apterus*, *Graphosoma lineata*. Later on we ascended the left bank, where, in a ditch overhung by a quantity of ferns, we noticed *Osmunda regalis*, and *Asplenium Virgilii* (a variety of *A. Adiantum-nigrum*).

November 9. Patches of snow were visible on the summit of Monte Rotondo as we left Corte this hot and cloudless morning. Then passing Ponte alla Leccia, we arrived at a gorge of chlorite slate, through which the Golo forces its way,—rocks, sands and boulders of a greenish white,—and finally entered on the flat tract of land that extends for several miles along the coast south of Bastia, the last and by far the most uninteresting part of our journey that now lay by a straight and level road fringed with numerous aloes (*Agave americana*), and running parallel to the Stagno di Biguglio, a large and brackish pool where numerous waterfowl frequently congregate, extending for a considerable distance on our right, and only separated from the sea by a bar of sand. I captured a small specimen of *Ocypus cyaneus* on the afternoon of our return.

November 10. Walked out a mile or two on the Brando road, where I had previously taken *Decticus albifrons* and *intermedius*. The day again intensely hot; I gathered *Adiantum Capillus-Veneris* and *Lycopodium selaginella*, which covered a damp wall on the left. *Lagurus ovatus* grew plentifully here, and the cyclamens were still in bloom. Many holiday people were out in this direction, and soldiers were fishing from the rocks.

November 11. Called on Mrs. Short, the Consul's wife, who presented me on leaving with a nosegay from her garden, of orange-blossom, lilac, fuchsias, heliotrope and scented geranium.

November 12. A drinking fountain of white marble close to the quay—apt type of the geological riches of the island we were quitting: the matin hymn rose in air from some unseen fraternity: *et sol jam surgit. Eundum est.*

F. A. WALKER.

Notes at Sea. By JOHN CORDEAUX, Esq.

MAY, 1873.

Common Scoter.—May, second week. In small flocks from the Humber to Southampton Water. One pair of velvet scoters seen in Dungeness Roads.

Guillemot.—Sparingly distributed (compared with the numbers we find, at this season, north of the Humber) from Humber to South Foreland, and more common from thence to the Isle of Wight. Usually seen in pairs, and never exceeding six or eight together. On the 8th, near the Inner Dowsing Light-vessel, I observed a guillemot having a most remarkable turned-up bill. It was close to the schooner, and we watched it both with and without the glass. The beak was gradually curved upwards from its base to the tip, and as greatly and perceptibly as in the godwits.

Razorbilled Auk.—The same remarks apply as to the last, but I never saw more than a pair together. Of a pair off Rye, one was in summer plumage; the other in a most curious state of moult, having the back of the head, neck, part of back, and wing-coverts very light brown, giving the bird a pied and most unusual appearance.

Puffin.—None seen.

Redthroated Diver.—About five seen. One on Norfolk coast, off Hasborough, was in the speckled plumage, and had no trace whatever of the cochineal gular patch, the throat being pure white. Another off Fairhill, Hastings, had acquired his red gular patch.

Blackthroated Diver.—A fine example in summer plumage, with the black gular patch, seen off the east point of the Isle of Wight.

Gray Geese (species not identified).—Four seen flying northward when off Rye.

House Martin.—May 10. Straits of Dover, about midway of channel, but nearest the French coast, a flight of martins passed,

flying close to the water and towards the South Foreland; wind strong in puffs, and W. by S. $\frac{1}{2}$ S. Monday, May 13th, early morning.—Wind S.W., calm and fine. Off Dungeness, another flock of martins came in.

Sand Martin.—Only two seen crossing.

Chimney Swallow.—Sunday, May 11. At anchor just within Dungeness, the lighthouse bearing N.N.W. half-a-mile; wind W.S.W., very strong, and in the afternoon backing to S.W. and blowing a gale; there was a thick sea mist or roke driving in over the point. From daylight to dark swallows, *in pairs*, were constantly coming in from the channel. The day was bitterly cold, and the poor little birds flew listlessly, as if much exhausted, or in a half-torpid state. Again, on Monday morning, May 12th, calm and still, wind S.W., many swallows, likewise in pairs; and the same during the day between this and Beachy Head. They all flew just above the water.

Swift.—Monday evening, May 12. Swifts in small parties, and numerously, have been coming in since daylight; they flew invariably about forty or fifty yards high. Likewise from Dungeness to Beachy Head and thence on to Selsea Bill (May 13th), many observed passing over to English coast.

Terns.—May 12, early morning. Terns coming in from sea towards Dungeness. Two Sandwich terns observed, many common and a small flock of the lesser tern.

Pomatorhine Skua.—One, a very fine example, and apparently nearly mature, off Dungeness, was first observed on the water close to the schooner, afterwards harrying and chasing the gulls.

Common Whitethroat.—One came on board on Sunday morning early (May 11th); strong W.S.W. breeze: it remained a short time, and then flew to a "Chasse Marée" riding nearer the coast. Several other small birds like willow wrens seen but not identified.

Lesser Whitethroat.—May 13. Off Sussex coast, and about ten miles at sea, a lesser whitethroat flew against the main sail and came fluttering down on deck. The little fellow seemed much exhausted, sitting for some time on the companion-hatch, with his feathers puffed out and eyes shut; from this he took refuge in the gig, and began dodging about amidst the oars and spare halyards stowed there, with all the assurance of threading a bramble-bush. He finally left us when nearing the Isle of Wight.

Crested Cormorant or Shag.—Two seen fishing in Southampton Water.

Carrion Crow.—I was much amused in watching the proceedings of a crow on Southampton Water, beating for food with some gulls: he flew backwards and forwards, hovering at times like a tern, and thrusting his feet on the water picked up at the same time with his bill some small fragments of floating matter.

Gulls.—All gulls seen along the east and south coast were either in the second or third summer's plumage or in transition. On Southampton Water I first saw some mature herring gulls.

Great Cotes, Ulceby, Lincolnshire,
May 20, 1873.

JOHN CORDEAUX.

Ornithological Notes. By H. DURNFORD, Esq.

An Oological Expedition to Holyhead Island.—On the 16th of May last, with my brother, I paid a visit to Holyhead, to see what we could get in the way of eggs. Starting early on Friday morning, having arrived at Holyhead the night before, we walked to the South Stack, a small round rocky island, about an hour's walk from Holyhead, observing on our way many flycatchers, wheatears, stonechats and a few cuckoos. Herring gulls were numerous, feeding in the fields amongst the rooks and following the plough—a habit which was new to me.

Guillemot and Razorbill.—On gaining the edge of the mainland opposite the island we found a long narrow suspension bridge across the strip of water, closed by a gate at the Holyhead end: here we had to ring a bell to inform the keeper of our approach. Whilst waiting we had time to contemplate the hundreds of guillemots which sat in long rows, like sentinels, on the narrow ledges of the rocks behind us, frequently darting like arrows into the sea beneath: a few razorbills were amongst them. Neither of these birds had commenced to lay, which they do regularly about the 24th of May, arriving at their breeding-stations some ten days previous: however, we obtained about a dozen eggs, taken last spring.

Herring Gull.—On being admitted to the lighthouse we were disappointed to find that the herring gulls, about thirty pairs of which nested on the grassy slopes near its base, were closely

protected, and on no account were any eggs allowed to be taken, especially as the birds had been incubating a fortnight: we procured as many as we wanted, however, from the lighthouse-keepers, who had taken them this season when freshly laid, at which time they are much valued as food. The nests were placed about a foot from each other, close to the base of the lighthouse, and were formed of sea-weed and dried grass. These birds arrive and depart regularly at the same time in the spring and autumn, and are very jealous of their tenements, not allowing even their own young to nest amongst them. The lighthouse-keeper informed us that a party of lesser blackbacked gulls once tried to establish a colony on this rock, but were speedily ousted by the herring gulls. They also nest on grassy ledges here and there along the west coast of the island wherever the rocks are not too steep.

Cormorant.—There is a small colony of cormorants which breed on very steep rocks between the North and South Stack Lighthouses; but as they nest on the most precipitous ledges their eggs are rarely obtained, nor could we hear of any one who had any, though we made numerous inquiries.

Oystercatcher.—On leaving the South Stack we continued our walk along the south-west coast, but the only birds we met with nesting were oystercatchers, of which we found four or five nests, each containing three eggs. The nests were placed in small hollows amongst the stunted grass on the rocky promontories, generally about thirty feet above the sea, each pair of birds occupying a rock to itself. In all cases we disturbed the old bird from its nest, which was composed of small pieces of broken rock, shells and drift-wood; and in one instance, where rabbits were particularly numerous, on a small rocky island in the channel between Holyhead Island and Anglesea, the nest was partly made of their dung: we also met with a nest, in a sandy bay at the foot of some sand-hills, composed entirely of small pebbles and broken shells. In every instance the old birds flew anxiously around us, uttering loud and oft-repeated whistles as long as we stayed in the neighbourhood of their nests.

Sanderling, &c.—We observed a small flock of sanderlings on a long piece of shingle, where the ringed plover was nesting, and a few common sandpipers and turnstones here and there along the coast.

Curlew.—We were informed that curlews nested on some high land in the south-west of the island, but we walked over it without seeing any birds, though we observed a small party of seven or eight in a very restless state on the west coast.

A few Notes on the Birds that breed on Walney Island.—On the 31st of May I paid a visit to Walney Island, and the following notes from my diary will, I hope, be acceptable to the readers of the 'Zoologist.' I put up at a small inn close to the ferry at the village or hamlet of North Scale, which is a very convenient position for eggging, being about three miles from the north and six from the south end of the island.

Blackheaded Gull.—On arriving at North Scale from Barrow I walked to the north end, and after some little difficulty persuaded the proprietor of the land on which these gulls nest to allow me, in company with one of his watchers, to visit them. A description of this gullery is unnecessary, as there is an excellent account of it by Mr. Harting in the 'Zoologist' for August, 1864; suffice it to say it was a sight to gladden the eyes of any ornithologist, and one worth going any distance to see. The gulls were a full fortnight earlier this year than usual, and they all, with the exception of two pairs, had young ones; and a very pretty sight it was,—nestlings of various ages, from two or three hours to a fortnight old, dotted the ground in all directions; some squatted in their nests, those a little older tried to hide themselves by squatting as closely as possible to the ground, and those still older again trusted to their legs, and after running a short distance buried their heads in the grass, thinking, I suppose, that if they could not see us we could not see them; meanwhile the old birds were screaming and dashing wildly about our heads. As there were none but addled eggs to be taken now, I procured several from the watcher, who had taken them some little time before whilst fresh: these eggs vary excessively both in size and ground colour. This gullery is now most jealously guarded by the proprietor, who resolutely turns back everyone applying to see it: he has found this course necessary in consequence of the wholesale robbing of nests which went on year after year, when any one was allowed to visit it; for six weeks this spring, whilst the birds were laying, he had two men sleeping in a shepherd's hut not three hundred yards from the nests, who took

turns to watch them all night, and now he employs a man specially to look after them. These gulls are very valuable to him, not for the sake of their eggs, but on account of their dung; they manure his land, and keep it entirely free from worms, slugs, and noxious insects, closely following the plough amongst the rooks. It is a curious fact that though so closely protected they do not seem to increase at all in numbers, but about the same quantity return year after year: presumably the young ones find other breeding quarters.

Oystercatcher.—Pretty numerous, nesting freely amongst the large stones and drift sea-weed above high-water mark at both ends and along the west coast of the island: one nest I found in the latter situation was made entirely of broken pieces of drift-wood, sticks, straw and sea-weed, so wonderfully do these birds adapt their nests to the nature of the ground on which they fix their temporary homes. I have recorded an instance of this in my notes on Holyhead Island, where a pair of oystercatchers had partly made their nest of rabbits' dung, in order, no doubt, that it might look as much like the adjacent land as possible. In one nest I found a young bird about two days old and two addled eggs; the nestling greatly resembled a young lapwing of the same age; its chest, throat and stomach were of a spotless white, and its upper parts delicately barred with dark gray and brown: I was struck with the large and apparently disproportionate size of its legs and feet: one of the old birds, probably the female, feigned lameness on my approaching the nest: I have never seen an oystercatcher do this before, though they always fly anxiously around the intruder, uttering piercing screams, rather than whistles.

Ringed Plover.—Numerous along the north, west and south coasts. I disturbed one bird in a little hollow in the sand-hills by coming suddenly up from behind a hillock; she was so astonished at my appearance that she stood still by her nest for some seconds before taking flight: there were three eggs in the nest, and one about a foot outside, quite cold but fresh. Did the latter egg belong to another bird?

Shieldrake.—About three pairs nesting at the north and four at the south end, but their nests are very hard to discover. Mr. Geldert, the lighthouse-keeper, told me a curious fact connected with the nesting habits of this species. During the time the female is incubating, after feeding, she, in company with the

male, flies to the neighbourhood of her nest, and after circling once or twice in the air over the spot, to see whether the coast is clear, flies straight into the hole without alighting on or touching the ground; and the mallard, after performing one or two more circles, flies off to his breeding quarters on the extensive sandy flats of Walney.

Dunlin, Sanderling and Turnstone.—On the west coast I observed an enormous flock of dunlins. I suspect birds of the previous year do not breed, as there are dunlins on the Crosby shore, more or less, every month in the year. Sanderlings were frequently seen in small parties; and I noticed one small flock of turnstones, numbering about eight birds, and one pair which were so tame that I thought they must have a nest in the neighbourhood, though there was no likely place for it.

Sandwich Tern.—These birds, like the preceding, nested much earlier than usual this year: on my visit in May I found the young had flown and left the neighbourhood with their parents, whilst in 1864 they were still incubating at that time. There were only four pairs this year, whilst Mr. Harting found seventeen pairs nine years ago; and this is the more unaccountable as they are preserved, if possible, more closely than the gulls. The son of the proprietor was kind enough to give me two eggs, taken this season: they are of a beautiful light gray ground colour, speckled with dark gray, brown and black, a good deal larger than the eggs of the common and arctic terns, nearly approaching in size some small eggs of the blackheaded gull; the markings and measurements are also smaller than those of the other terns' eggs.

Common Tern.—The most numerous species of tern on the island. I saw about fifty pairs at the north and south ends; they were, however, only just commencing to lay, which they do on the sand-hills. I was told they used to lay on the shore, but since their nests have been so much robbed they have taken to lay inside the sand-hills. I took six eggs of this bird: they made no nest, but deposited their eggs in a slight cavity in the bare sand.

Arctic Tern.—These birds, like *S. Hirundo*, had only just commenced to lay, and I did not find a single nest, though I received two eggs, taken two days before, which I believe belong to this species. I observed about ten pairs at the north and south ends of the island, but unless you are pretty close to them it is impossible to distinguish them from the common tern.

Lesser Tern.—This species, like the two former, had just commenced to lay, but I did not see more than three or four pairs on Walney Island. On Foulney Island there were about four pairs nesting, and I succeeded in finding two nests amongst small pieces of broken shells, gravel, sand and small pebbles. This was the only species, with the exception of one or two pairs of ringed plovers, nesting in this island; and a flock of curlews feeding on the pasture-lands, and some immature lesser blackbacked and herring gulls, were the only other birds on the island.

From the above I should say the terns are much less numerous in Walney and Foulney Islands than they were nine years ago, and the large shooting or slaughtering parties which used continually to visit the latter have effectually banished the birds from it. Mr. Geldert, the lighthouse-keeper, informed me that he once shot sixteen "sparlings" (common terns) at one shot on Foulney.

I regret to say there is a good prospect of coal being found under the whole of Walney Island, and they are going to begin boring at the south end at once: if they should be successful I fear the island will no longer be a breeding-place of the most beautiful of our sea-birds.

H. DURNFORD.

1, Stanley Road, Waterloo, Liverpool,
May, 1873.

Notes from Leiston, Suffolk. By G. T. ROPE, Esq.

CONSIDERING the unusually mild character of the winter we have had a fair quantity of ducks over, but very few wigeon came to feed on the marshes before January. From the absence of severe frosts ducks have been in capital condition; I weighed several at the latter part of November, shot at the evening flight: the heaviest mallard reached three pounds two ounces, the heaviest duck two pounds twelve ounces, another duck two pounds ten ounces.

Nov. 12. Wind N.E. Very stormy. Several lots of fowl flying round about over the marshes, it being too rough for them out at sea. A great many large gulls about, principally the young of the lesser blackbacked and herring gulls. Saw a single snow bunting on the beach; it remained near the same spot several days. There have been a good many jackdaws here of late, in company with the rooks: they are far from common birds here generally, though

plentiful enough a few miles inland. Is it not likely these birds (like some of the rooks) were migrants.

Nov. 14. Wind east, a very stormy day. A good many snipe in the marshes, and several lots of fowl. I saw a longtailed field mouse this morning among the tufts of long grass on the highest part of the beach.

Nov. 15. Observed a kingfisher on the sea-wall. For the last few days a seal has been seen in the Orford river, near the quay.

Nov. 18. A great many ducks in the flooded marshes to-day.

Nov. 23. Shot a female goldeneye; it was in good condition, but I fancy an unusually small specimen, the whole length being only fifteen inches; from the carpal joint to the end of the wing seven inches and three quarters: weight one pound six ounces and a half.

Nov. 28. Lark singing. Both song thrushes and missel thrushes have been singing here at intervals throughout the last week in November and the first in December.

Dec. 5. Saw a green sandpiper at Blaxhall.

Dec. 12. Saw a few snow buntings on the beach, between Aldeburgh and Sizewell, in company with some larks.

Dec. 16. This morning I shot a landrail in a wet marsh, not far from the sea; I had observed one about a week before near the same place. Saw a small flock of golden plovers.

Dec. 19. Saw six scaup ducks on a large piece of water standing on the marshes. Immense quantities of peewits and gulls (*L. canus* and *ridibundus*) about the marshes. Saw a few golden plovers and a kingfisher near the sea. Watched some bearded tits this morning on the reed-land. I have since fallen in with them several times. Every winter there are numbers of blue tits on our reed-land; what food they find there to attract them in such numbers I am at a loss to know.

January, 1873. For nearly the whole of this month we have had a flock of goldeneyes on the water in the marshes. On the 3rd, with the help of a glass, I counted twelve, of which three only appeared to be adult males. I saw only eight on the 8th.

Jan. 16. Immense flocks of peewits about. The water having partially subsided, there is now abundance of excellent feeding-ground for ducks, those spots where there are here and there a few splashes left upon the marsh, and long rough grass and sedge left nearly dry, being preferred.

Jan. 17. Two swans in the marshes.

Jan. 18. Heard some redshanks this morning with the peewits. Although a good many of these birds breed here, we seldom see them in the winter in our marshes. Redshanks are among the commonest waders in East Suffolk, breeding in considerable numbers in the marshes, in company with peewits, and a large proportion of the "plover's eggs" collected about here are laid by redshanks.

Jan. 20. Watched a long time with a glass several goldeneyes, coots, and a few pochards, two of them adult males; there were also two males among the goldeneyes. As they continually kept diving it was impossible to make out their exact number, but I counted ten coots above water at the same time. Coots have been rather numerous here this winter; for the last two years we have had scarcely any.

Jan. 21. Wind N. and N.W. Got a couple of jack snipe this morning from a swampy place at the back of the beach; saw two more.

Jan. 28. A great many ringed dotterel feeding with the peewits on the marshes.

Jan. 29. Several lots of wigeon about: saw a flock of golden plover.

Jan. 30. For the last few days we have had four geese every day in the marshes; I believe them to have been bean geese, but cannot be certain of the species.

February 2. Wind E., very stormy, with a good deal of snow. Several large lots of fowl flying round about over the marshes.

Feb. 3. My brother shot an adult blackbacked gull; he was flying straight inland, from the sea at dusk, as if to pass the night upon the marshes. The man who skinned this bird found inside him a large rat, whether a water rat or a common brown rat I cannot say.

Feb. 4. Heard some geese to-night at flighting time, also the crow of a cock pheasant.

Feb. 6. Some shieldrakes on a marsh close to the sea: tried to stalk them, but unsuccessfully.

Feb. 7. Shot a knot; it was alone, and was feeding at the edge of a piece of fresh water; this was a remarkably tame bird. Several blackheaded buntings now frequent the lines of faggots which are

placed along the beach here to prevent the encroachment of the sea.

Feb. 11. A hawfinch killed about this date in a garden at Blaxhall. My brother shot a fine old male scaup this morning, it was a single bird, and had been seen near the same place two or three days.

Feb. 17. Great quantities of peewits in the marshes; also a flock of some small *Tringa*, probably dunlins, and among them a single golden plover; when on the wing this bird, though nearly double the size of the others, acted exactly as if it were one of them, turning at the same moment as they did, and keeping nearly in the centre of the flock.

Feb. 19. Saw a single pair of siskins about some alders: I believe these birds are far less frequent here than in West Suffolk.

Feb. 24. Put up a snipe this morning, which immediately began bleating, as they do in the breeding-season.

Feb. 25. Saw five or six pintails alight in some water standing in the marshes, but could not get near them. There have lately been flocks of greenfinches and a few sparrows feeding on the beach, close down to the sea,—I suppose upon oats, a quantity of which have been washed ashore from a vessel wrecked close by; the rooks seem also to have found them out.

Feb. 28. Shot a chiffchaff at Blaxhall; heard the call of the great tit.

March 3. A good many ducks come now to the marshes at night. Redshanks are getting back to their breeding haunts, their numbers keep gradually increasing.

March 4. Very warm. A good many snipe bleating and uttering their breeding note, day and night. Waterhens are also very noisy now at night; besides their usual note I heard them utter a short sharp whistle, exceedingly loud considering the size of the bird.

March 6. Both marsh and cole tits appear to be rather numerous here just now; I saw some of the former to-day on some furze bushes. We have had four geese here for the last two or three days; I believe them to be whitefronted by their note.

March 8. Ringed dotterel have arrived at their breeding-station here, between Sizewell and the Dunwich Cliffs.

March 11. Saw a weasel this morning on the beach and found his nest, which was under a pile of wood; it was made of moss and dry grass, and contained a short-tailed field vole, a lark (freshly

killed), and a great quantity of feathers; both the lark and the mouse had had a bite at the back of the skull.

G. T. ROPE.

Leiston, Suffolk, March, 1873.

Mice in East Suffolk.—The beautiful little harvest mouse (*Mus messorius*, Shaw), though I believe nowhere very numerous, is not uncommon in this part of Suffolk. I have met with it in several different localities,—at Gedgrave near Orford, at Blaxhall, and at Leiston,—and I once found a nest at Washbrook, near Ipswich. Mr. Southwell (Zool. S. S. 2756) mentions the nest of this species having been taken from among the tall sedges by the side of the Waveney, and also at Kessingland, among the marram-grass on the beach. This and the common house mouse (*M. musculus*)—only the latter, of course, in sufficient numbers to be of any consequence—are the only species which are here found in stacks of corn, when threshed out, excepting perhaps a stray longtailed field mouse (*M. sylvaticus*) or two. I do not recollect ever seeing an example of the short-tailed field vole in a stack of corn of any kind, for although a few may occasionally be carried in at harvest time, I do not think it likely they would remain there; nor have I ever met with them in barns, granaries or buildings of any kind, although most writers on the subject have accused them of doing much damage in such situations; their habits and the nature of their food seem to me to make it very unlikely that they should take up their abode there. I fancy this little animal has had more than its due share of abuse, for though exceedingly numerous as a species, it is certainly far less injurious to the farmer (at all events in this neighbourhood) than either *M. musculus* or *M. sylvaticus*, however destructive it may be to young trees and shrubs. The longtailed field mouse is well known to be a great consumer of seed-corn when first put in the ground, and also of the ripe wheat at harvest time, remaining in the field till the stubble is ploughed, when numbers are turned out of their burrows by the plough. When the corn is all housed the “long-tail” resigns his claim to it, and his congeners, *M. rattus* and *M. musculus*, carry on the work of destruction. I have at different times kept many meadow mice (*A. agrestis*) in confinement, and can speak from experience as to grass and the leaves of various plants forming a large proportion, if not the bulk, of their food, though I have occasionally found ears of corn in their runs: they are very numerous in some places, where it is quite impossible for them to have access to corn of any kind; for instance, small islands consisting entirely of pasture-land; and I might mention, by way of example, that long strip of beach extending from Aldeburgh to the mouth of the river, having water on both sides of it, where they abound and attain a very large size. I have on more than one occasion taken the bank vole

(*A. pratensis*, Baillon) in the neighbourhood of Saxmundham, in this county, and once caught two, a male and female, in one trap and in one night, upon a piece of artificial rockwork, which indeed they seem to be very partial to; the female, which I kept for several months, fed principally upon grass, bread, nuts, and fruit of various kinds, and became very tame: they make prettier pets than the common meadow mouse, both in colour and form. Two or three instances have come to my knowledge of the longtailed field mouse having been taken in dwelling-houses. I remember several being caught some years ago in a dairy, attracted there perhaps by the milk. One I had in a cage killed and partially devoured a smaller one of its own species, though well supplied with food at the time. There is something very kangaroo-like in the actions of this graceful little animal, not only in the long bounding leaps which it takes (in which the comparatively small fore limbs take but little part), but more especially when it is moving slowly about while feeding. I have seen one of these mice raise itself to nearly its full height when sitting upon the edge of a vessel no thicker than a common tea-cup, the large and powerful hinder feet only grasping the edge. I fancy this species is more strictly nocturnal in its habits than any of the three British voles.—*G. T. Rope; Leiston, Suffolk.*

Wild Birds Protection Act.—I am sorry to read the remarks (Zool. S. S. 3576) of my friend Mr. Pickard-Cambridge on this Act. I am certainly not an admirer of it, but his strictures are founded on an entire misapprehension as to facts. With his opinions I have nothing to do, though I would observe that if the Act is "objectionable in *principle*," equally objectionable in principle must be a certain admonition (Deuteronomy xxii. 6, 7), to which he doubtless accords respect. But Mr. Pickard-Cambridge asserts that the Act "was conceived by short-sighted sportsmen, and brought forth by ornithologists many generations behind the times." A very short statement of the case will show that neither of these assertions is correct. The Act is due to the Wild Fowl Protection Bill, printed in the 'Zoologist' last year (S. S. 3139), and prepared by the Close-Time Committee of the British Association, appointed at Edinburgh in 1871, and consisting of Mr. Barnes, Mr. Dresser, Mr. Harting, Canon Tristram, and myself. I am conscious of possessing many old-fashioned ideas, and therefore I am not at all disconcerted at being considered an ornithologist behind the age, but such a description will hardly apply to many of my colleagues. I will also plead guilty to being "short-sighted" (in a physical sense), but I am sure that of our Committee the term "sportsman" can only apply to Mr. Harting, while without divulging our secrets I may add that the idea of the Wild Fowl Bill did not originate with the author of 'Hints on Shore-Shooting.' It may be, however, that the members of our Committee

generally, though not sportsmen, were "short-sighted" in another sense. I must confess that they did not foresee by some four or five months, that a Peeress of the realm would indite a sensational letter to 'The Times' complaining that nightingales would rather obey their migratory impulse than stop in her garden, or that a sentimental Member of the Commons would be so moved thereby as to persuade an almost deserted House to change a well-considered, reasonable and definite proposal—a proposal which so far as it went was "thorough"—into one far wilder than the wild birds he wished to protect. The members of the Close-Time Committee are not accountable for this folly, but I am sure its authors would repudiate the notion of being called "sportsmen," and no one who has read the Act could accuse them of being "ornithologists" of any time.—*Alfred Newton; Magdalene College, Cambridge, June 2, 1873.*

Ornithological Notes from Lancashire.—To avoid confusion I have placed a "*D.*" at the end of all my notes: the others are by the Baron A. von Hügel.—*H. Durnford.*

APRIL, 1873.

Lapwing.—Observed a large flock flying north on the 18th of March: several had nested about Crosby by the 1st of April.—*D.* Returned to their breeding-quarters near Stonyhurst on the 9th of March, and a nest with two eggs was found on the 17th.

Dunlin Sandpiper.—Some seen on the 8th were still in full winter plumage; but out of a flock of about a hundred birds observed on the 26th most had acquired their black breasts.—*D.*

Common Sandpiper.—Arrived at their breeding-quarters along the Ribble and Hodder on the 16th.

Sand Martin and Swallow.—Sand martins returned on the 17th, and swallows on the following day.

Golden Plover.—A small flock of seven flying northward, on the 19th, made a stay of a day or two on some low meadows near Formby; they were in nearly full summer dress.—*D.*

Stock Dove, Wheatear, Sky Lark, &c.—April 20. These birds are all now engaged with their nests among the sand-hills between Liverpool and Southport. On the 26th I found two young stock doves, about a week old, in an old rabbit-burrow; also a nest of the sky lark and titlark, and two of the pied wagtail; the latter invariably nest here on the ground, generally close to one of the numerous pools under the shelter of some overhanging tuft of grass. I was unsuccessful in my search for the wheatear's nest, though they had undoubtedly laid, as the males were alone visible.—*D.*

Fieldfare.—Last seen on the 20th of April near Stonyhurst; and on the 2nd near Crosby.—*D.*

Sheldrake.—I observed a pair on the sand-hills on the 20th. These birds, I believe, used to breed here, and would no doubt do so again if only left in peace.—D.

Ringed Plover.—A nest with eggs was found about the 15th amongst the sand-hills in the neighbourhood of Formby. 20th.—I observed one standing up to its stomach in a pool, and scattering the water over its back by dipping its head and flapping its wings; it then came out of the water and shook itself vigorously until dry. 26th.—Several pairs now have eggs in the sand-hills, and use various devices to draw the intruder from the neighbourhood of their nests. The keepers, rustics, &c., about here always call these birds "Pew Williams," which evidently has a connection with "Dulwilly."—D.

Cuckoo.—First seen and heard on the 26th near Formby.—D.

Corn Crake.—First heard on the 27th near Waterloo.

Yellow Wagtail.—Observed one on the 30th near Liverpool.—D. A pair observed on the 25th March along the river Hodder.

Common Tern.—A local name by which this bird is known about here is "scrag."

MAY, 1873.

Guillemot.—1st. A fine adult bird, in breeding-plumage, was washed up on the shore near Waterloo to-day; it had been dead only a few hours.—D.

Cuckoo.—First heard on the 3rd.

Dunlin.—8th. Observed seven flying due north, very high; fresh north-west wind at the time.—D.

Corn Crake.—9th. First heard at 11 P. M.

Lesser Tern.—10th. Paid a visit to the Point of Air, Flintshire, a breeding-place of this species; they had not, however, yet arrived at their nesting-quarters, though I found them there on the 7th of June.—D.

Swift.—Observed a great quantity near Flint, hawking over a large sheet of water, on the 15th.—D. First seen on the 12th, and appeared in large numbers the same day.

Gray Plover.—My brother observed a small party of seven on the mud-flats near Crosby on the 21st; they were feeding and very tame.—D.

Blackheaded Gull (locally called "turnock").—Two pairs have laid in wet places in the sand-hills near Formby this spring, to my knowledge. Two eggs were found on the 21st, which I subsequently secured, and I have seen two more taken about the same time. The inhabitants of the neighbourhood never remember this bird nesting here before.—D.

Birds attracted by Lighthouses.—25th. The lighthouse-keeper at Leasowe, near Hoylake, told me to-day that starlings, blackbirds, thrushes, a few cuckoos, woodcocks and curlews occasionally kill or stun themselves against the light during foggy weather.—D.

Ornithological Notes from Longparish, Hants, during April and May, 1873.—

Nightingale.—Two heard, for the first time, on the 15th April.

Cuckoo.—Heard and seen, for the first time, on the 17th April.

Corn Crake.—First heard on the 22nd April.

Common Sandpiper.—One seen at Clatford on the 10th April, and again on the 17th. Two seen near Tufton on the 25th, and one at Longparish on the 26th.

Green Sandpiper.—One seen on the 5th April, on Bransbury Common, as wild as usual; and on the 23rd one observed near Tufton.

Whimbrel.—A pair seen on the 27th, and again on the 29th, on Bransbury Common. It is unusual for so many of our waders to visit this neighbourhood, even during the spring and autumn migrations.

Swift.—One observed on the 5th May near Longparish.

Variety of Starling.—May 5. An almost pure white bird was observed at Clatford to-day.

Young Snipe.—A single young bird, just hatched, was found this morning on Bransbury Common, which is, I think, the most beautiful little thing I have ever seen: its head is of a delicate russet, barred and speckled with grayish white; neck and throat underneath chestnut-red, above darker, spotted with white; chest and stomach above light russet, below black, speckled with white. Its back is the handsomest part of all, spangled with black, chestnut and white in about equal proportions. Thighs darker; legs and toes light slate-colour; the joints of these and the claws darker; beak dark slate-colour.—[Communicated by H. Durnford, Esq.]

Arrival of Spring Birds in Nottinghamshire.—Wheatear, March 26th; willow wren and chiffchaff, 31st; swallow, April 15th, at Rainworth: sand martin, 16th, at Ollerton; wood wren, 21st, at Rainworth; whitethroat, 22nd, at Ramsdale; corn crake, 26th, at Calverton; yellow wagtail, 27th, at Rainworth; common sandpiper, 27th, at Rainworth Water; cuckoo, 28th, and redstart, May 1st, at Ramsdale: whinchat, 6th: house martin, 7th; turtle dove, 9th; swift, 16th; flycatcher, 20th, at Rainworth.—*J. Whitaker, jun.; Rainworth Lodge, Notts.*

Arrival of Spring Migrants, &c.—There has of late years been so much building here, and in the neighbourhood, that many of our birds have been driven away or become scarce; for instance, the goldfinch, now a somewhat rare species in the Undercliff, was so common fifty years ago as to be found nesting in most of our orchards where there were lichen-covered apple and other fruit trees, and considerable flocks were to be seen in the autumn feeding on the thistle about and on the downs. The thrush, too, is comparatively scarce, hundreds having perished or been shot during a severe winter or two, when scores of young men and boys were popping at them from morning till night; however, thanks to the gun license, they have had

some respite of late, and we may hope to be again cheered with their well-nigh unrivalled song. The bullfinch was fast disappearing, and might have become extinct but for the new law and gun license. Of the blackbird, being a wary species, we have still a goodly number, and one has been singing all the spring from the topmost branches of a tall poplar in the High Street of the town, to the great delight of passers by, both pedestrian and equestrian: its song has been heard as late as 8.20 P. M. Though there is a young but well-fledged blackbird lying dead on the lawn, the old bird (the parent, I know) is singing merrily perched on a tree overhead. The only two species that have increased and multiplied, and that tenfold, are the house sparrow and the starling; in fact, the latter was hardly known in the Undercliff in my younger days, nor do I think they were to be met with in any number till the building of Steephill Castle. In a walk of some two or three miles about Wroxall and over the downs, on May-day, not a dozen species were observed, and I neither saw nor heard the cuckoo; but then the whole of the copses, their favourite haunt, on the northern face of the hills, have been cut down and grubbed up. Some noble and lofty pines, too, in whose closely-matted branches and dense foliage a colony of sparrows had their nests, have shared the same fate. The cuckoo was first heard in the third week in April. I saw no swallows till the 30th of April, the latest period I have known them arrive (the earliest being the 2nd); I hear, however, that swallows were seen about the middle of the month at Godshill. The first chiffchaff observed on the 30th of March; but it was not until the 30th of April, when there was a sudden rise of temperature of some ten degrees, that many were seen; on that day both the chiffchaff and willow wren were swarming in the garden, but their stay was short, as none breed here that I am aware of, never having seen or found their nests. On the 3rd of May I saw five or six swifts hawking about the cliffs near Dunnose. A pied flycatcher, a rare bird in the island, was seen at Blackgang during the first week in April.—*Henry Hadfield; Ventnor, Isle of Wight, May 16, 1873.*

Orangelegged Hobby in Essex.—Colonel Hawkins records, in a letter to Dr. Bree, published in the 'Field' of June 7, the occurrence of a specimen of this rare bird at Alresford on the 31st of May, and adds, "My impression is that the bird was blown over during the continuance of the N.N.E. gales which had prevailed previous to that date.

Strange Nest for the Hedgesparrow.—On Monday, May 12th, I was looking for birds' nests, but with poor success, owing to the birds having only just began to lay in this part of the country, though in the nests in Hampshire many of the young birds hatched out a fortnight ago. Just as I was giving up the search in despair, I dropped upon two eggs of the hedgesparrow laid in a shallow depression on the ground at the corner of a country lane. I mentioned this fact to a gentleman of experience in this

neighbourhood, and he tells me he has not unfrequently met with similar instances; the nests being often torn out by village boys as soon as completed, the birds are compelled at length to lay their eggs anywhere.—*A. G. Butler; Bankside House, Sittingbourne, Kent.*

Peculiarity of Roosting observed in a Woodpecker.—Some years ago I took a young woodpecker from the nest in an old rotten oak tree, and reared it. At night it roosted by hanging from the top of the cage back downwards, and the head behind the wing. I have never met with any person who could tell me whether they roost in the same position in a wild state. It seemed to me quite natural to the bird.—*From the 'Field,' June 21.*

[The fact of the woodpecker roosting suspended with its back downwards is very interesting, but the additional statement, "and the head behind the wing," I consider questionable. Is it a fact that birds put their head behind the wing in roost? I have many wild birds in confinement, and have never observed this attitude: the beak is often thrust among the scapularies, but the head always appears to me *outside* the wing and not beneath it.—*E. Newman.*]

Anecdote of a Kingfisher.—A lady resident a few miles from Norwich has in her dining-room four pairs of canaries with several young ones in some large breeding-cages. On the 11th of June, about eight o'clock in the morning, the attention of her servant was attracted by an unusual fluttering of the canaries, which was found to be caused by the strange circumstance of a kingfisher clinging to the wires of one of the cages, where it was caught by the hand and kept in confinement for a few hours, when it was allowed to fly away. It was a young bird of this year, but fully fledged, and had probably been hatched in the neighbourhood, as a brook runs through some meadows adjoining the house which the kingfisher thus entered.—*J. H. Gurney.*

Night Heron in Jersey.—A beautiful male specimen of this bird was shot last week in St. Ouen's parish, by Mr. J. Vibert, and is now being stuffed by M. Charlotte, naturalist, of Bath-street.—*From the 'Field,' June 21.*

Nesting of the Woodcock in Suffolk.—In the 'Ipswich Journal' for May 2nd, 1873, two instances are recorded of woodcocks having nested this season in this county. In the first case a nest containing four eggs was found at Ufford, all of which hatched off; one young bird was left dead in the nest, and has since been preserved in spirits; the other three have been seen with the old birds in the wood. The other instance was that of a deserted nest with four eggs having been found by Mr. Greene's keepers, at Ixworth.—*G. T. Rope; Leiston, Suffolk.*

Beaumaris Shark and Boar-fish at Hastings.—A specimen of the Beaumaris shark (*Lamna monensis*) was taken in the mackerel-nets by our fishermen this morning: it measured from the tip of the nose to the end of the tail four feet one inch, and round the thickest part of the body two feet. A nice specimen of the boar-fish (*Capros aper*) was brought to me a few days since: it measured five inches from the tip of the nose to the tip of the tail. I have preserved it in saturated salt and water for the present.—*J. S. Bowerbank*; 2, *East Ascent, St. Leonards-on-Sea, June 18, 1873.*

Voracity of Pike.—On account of the very high water during the past winter, and consequent overflowing of the river, there have been an unusual number of pike in the ditches and small water-courses near the meadows. Two instances of the voracity and cannibalism of this ponderous-jawed monster have come under my observation, which perhaps are worth recording. One morning at the end of February I was walking leisurely by a broad ditch where the weeds are very dense, waiting for a friend who was stalking a flock of fieldfares. At one place the water was clearer and comparatively free of weeds, and there I saw a fish, but I could make out no head to the creature. I judged it to be a pike from its striped and mottled back, but of what form the fish could be I was at a loss to conjecture, as it was stationed some twelve or fourteen feet from where I was standing, and the water seemed partly opaque. Having secured the services of my old friend the fisherman, he was not long in landing the cannibal and his victim, as it proved to be a pike which had partly swallowed one of his brethren, the head of the smaller fish going down the larger one's throat. When thrown out upon the grass the largest immediately disgorged the smaller, which was as lively as its captor. Neither of the fish were of large size, measuring respectively twenty-two and sixteen inches in length. The other instance is of two larger fish than the above. Walking by the river I observed a considerable splashing and commotion at some distance off, and the fins and tail of a fish frequently appeared above the surface of the water, but as there had been a number of salmon near the same spot a short time before, I supposed it must be some of them, so I gave them no very decided attention. On my return, several hours afterwards, I was surprised to see the same disturbance, but a man in a boat had now joined the affray, and was endeavouring to settle the matter to his own personal benefit by capturing the fish: it turned out to be two pike. The cannibal in this case had not been so fortunate as the one before described, having caught his victim in the middle of its back, consequently it was across his mouth rather than entering it. Thus one was locked in the other's jaws so firmly that neither had power to free itself from the uncomfortable situation. Both were living and very active when I saw them hauled into the boat, and neither fish, I should say, weighed less than twelve or thirteen pounds.—*G. B. Corbin.*

Large Salmon.—A monster salmon was lately netted in the Severn, between the New Passage and Littleton: its length was four feet nine inches, its girth two feet eight inches, and its weight over seventy-eight pounds. The largest salmon ever known to have been caught weighed somewhere about ninety pounds, so that the fish landed on Tuesday was within a dozen pounds of being the heaviest recorded example of his species. It remained on view for two days in the shop of a fish salesman in North-street, Bristol.—*W. Peard, M.D., in the 'Field' of June 21.*

Large Salmon.—There used to be in the town of Usk a portrait of a salmon weighing sixty-five pounds, which was taken in the river Usk; and I saw, two or three years ago, one of fifty pounds in Bristol, taken in the Severn; but the salmon I saw in the shop of Mr. Day, fishmonger, last week, eclipsed all I have ever seen or heard of, as the following particulars will show:—The length was four feet nine inches, the depth one foot, and the thickness six inches; weight eighty pounds. Of the dimensions I can speak with certainty, as I saw the fish measured; the weight I got from the fishmonger. That the fish was an old one the extraordinary size would indicate, as would also the conformation of the jaws, which were elongated into a cylindrical, or rather conical form, the under one especially, which was greatly curved inwards.—*W. Jones; Somerset-street, Kingsdown, Bristol.*
—*From the 'Field,' June 21.*

A Huge Lobster.—An enormous lobster was caught in Plymouth Sound in the trawl-net of our cutter-yacht "Hilda" on Friday, the 13th instant. It is quite perfect in every respect. Length from tip of the claw to end of tail three feet two inches; weight fifteen pounds two ounces and a quarter. Several small oysters, mussels and barnacles are adhering to the shell. The oldest fishermen here say they have never seen or heard of such a lobster before. It is now being preserved by Mr. Peacock, of Plymouth, who supposes it to be one hundred years old.—*J. Barrington Deacon; 6, Osborn-place, Plymouth, June 17.*—*From the 'Field,' June 21.*

Proceedings of the Entomological Society.

May 5, 1873.—H. T. STAINTON, F.R.S., &c., Vice-President, in the chair.

Additions to the Library.

The following donations were announced, and thanks voted to the donors:—'Proceedings of the Royal Society,' No. 143; presented by the

Society. 'Verhandlungen der Kaiserlich-Königlichen zoologisch-botanischen Gesellschaft in Wien,' vol. xxii.; by the Society. 'Tijdschrift voor Entomologie, nitgegeven door de Nederlandsche Entomologische Vereeniging,' 2nd series, vol. vii.; by the Society. 'Memoires de la Société Linnéenne de Normandie,' vols. xv. & xvi., and 'Bulletin de la Société Linnéenne de Normandie,' ser. 2, vol. v.; by the Society. 'Report of the Entomological Society of Ontario,' 1872; by the Society. 'Local Biology; followed by Remarks on the Faunas of Bath and Somerset,' by the Rev. Leonard Blomefield, M.A., F.L.S., F.G.S., &c.; by the Author. 'The Canadian Entomologist,' vol. v. no. 3; by the Editor. 'The Zoologist' and 'Newman's Entomologist' for May; by the Editor. 'The Entomologist's Monthly Magazine' for May; by the Editors. 'Cistula Entomologica,' pars vi.; by E. W. Janson. 'Notice Biographique sur M. Guillaume-Antoine Olivier, Membre de l'Institut de la Société d'Agriculture de Paris, par A. F. Silvestre, Membre de l'Institut et Secrétaire perpétuel de la Société d'Agriculture; lue à la Séance publique de la Société d'Agriculture, le 9 Avril, 1815;' by M. Ernest Olivier. 'Stettiner Entomologische Zeitung,' xxxiv., nos. 4—6; by the Entomological Society of Stettin.

By purchase:—'Catalogus Coleopterorum,' tom. ix., pars ii.

Election of Member.

The Marquis Giacomo Doria, of Genoa, was balloted for and elected a Foreign Member of the Society.

Exhibitions, &c.

Mr. Higgins exhibited a specimen of a remarkable insect recently described by Mr. F. Moore under the name of *Langia zeuzeroides* (said to pertain to the Sphingidæ). It was from the Himalayas, and had been bred by Major Buckley from a larva feeding on wild apricot. He also exhibited a female specimen of *Goliathus albosignatus* (Kirkii, *Westw.*), from the Limpopo, being, as he considered, the only known example of that sex.

Mr. M'Lachlan exhibited a coloured plate of butterflies from Turkestan. This he had been requested to show to English entomologists, as a sample of the manner in which the forthcoming work on the Natural History of Turkestan is to be illustrated. The entomological collections had been chiefly made by M. Alexis Fedtschenko during the years 1869—71. The work is to be published in the Russian language, with Latin diagnoses of the new species.

Mr. Bates alluded to an insect figured in the plate as *Colias Nastes*, *var. Cocandica*. *C. Nastes* had, hitherto, only been found in Lapland (*var. Werdandi*) and in Labrador and Arctic America, and it was a striking instance of the manner in which some species inhabiting the Arctic regions are found

southwards in mountainous districts, though not in the intervening plains. He mentioned also that *Colias Palæno* was found near the snow-line in the Alps, and in Lapland.

Mr. Müller said that he felt much interested in the remarks offered by Mr. Bates, as they confirmed his own conclusions, concerning the very close connection, or perhaps even identity, between the Arctic and the Alpine insect-faunas. He referred to one remarkable instance, namely, to the Genus *Parnassius*, and in particular to *P. Apollo*, which occurred in most parts of Northern Europe and Asia; but which in Central Europe—*i. e.* in Switzerland—was confined to the Alps and the opposite Jurassian range, carefully avoiding the intervening alluvial plains, which in the glacial period had been covered by the glaciers of the Rhone, the Reuss, the Rhine, and minor tributaries. He added that if the actual stations of the species were mapped they would all be found to exist outside, but along the moraines left by the ancient glaciers; and that the same was the case with *Delius* and *Mnemosyne*.

Mr. Albert Müller was desirous of making some inquiry concerning the literary remains of an entomologist. It was mentioned by Markus Lutz, of Basle, in his 'Moderne Biographien' (Lichtenstieg, 1826, pp. 39—40), that Johann Samuel Clemens, a native of Chambéry, in Savoy, was a clergyman in the Val d'Illies (Lower Valais), and that he was a learned naturalist. He is said to have formed a library of 8000 volumes, an herbarium, a collection of minerals and insects of the country; and is reported to have committed to paper many good observations concerning the Natural History of the Valais, none of which seem to have been published. He is said to have died in 1812. Mr. Müller said that he would be thankful to any Italian, French or Swiss entomologist who might be able to give information concerning the manuscripts of this divine, either by letter to himself or through any entomological publication.

Mr. Stainton exhibited a cocoon found by Mr. A. H. Swinton in the crevice of a wall at Kilburn. Its surface was smooth and extremely hard, and it had an oval opening at one end. Mr. McLachlan considered that it was an ancient cocoon of *Cerura vinula*, altered in texture and surface in consequence of the larva having had to construct it on a wall instead of on a tree-trunk.

Papers read, &c.

Dr. Sharp communicated a paper on "The Staphylinidæ of Japan," principally from the collection of Mr. George Lewis.

A paper was read entitled "Notes on the Ephemeridæ," by Dr. H. A. Hagen, compiled by the Rev. A. E. Eaton, M.A.—*F. G.*

Observations on the Natural History of the Night Parrot of New Zealand (Kakapo of the Maories). By T. H. PORTS, Esq.

THE following observations on the natural history of the night-parrot (*Stringops habroptilus*) may possess some interest to ornithologists. With the exception of the pigeon (*Carpophaga Nova-Zelandiæ*), the kakapo is perhaps the only true vegetarian to be found amongst the birds of New Zealand; bark, leaves, fruits, form some portion of its food; the tender fronds of ferns (piki-piki) are also eaten. In traversing the deep ferny gullies and mossy terraces of the Westland bush, its haunts may not unfrequently be noted from the traces it has left on the bark of certain trees; the prime favourite of the forest, for its bark, tender shoots and leaves, is one of the Araliaceæ (*Schefflera digitata*). This shrub, sometimes called kohi, is known to the West Coast graziers as the heener-heener,—not to be confused with hine-hine (*Melicytus ramiflorus*),—and greatly esteemed by them, for its extraordinary fattening qualities; in many places on the West Coast branches of it are cut for cattle-fodder: up the river Waio in S. Westland we noticed the marks of the kakapo on a great number of these trees, whilst many other species growing close by them were left unscathed. The favourite piki-piki is supplied by the young growth of *Asplenium bulbiferum*; the more open grounds of river-beds, some parts of the shores of inlets and sounds, exhibit here and there food-tracks so peculiar as at once to attract notice: these food-tracks appear as masses of chewed fibre from which nourishment has been extracted with the leaf left attached to the plants: last month, on the flat between the rivers Arthur and Cleddan, Milford Sound, we observed specimens of these hanging pellets on the broom (*Car-michellia*), tohe, tohe (*Arundo conspicua*), as well as on the phormium: on plants of the last-named, leaves had been chewed quite two feet from the point; this peculiar process caused the used portion of the leaf to look as though it had been roughly scutched and plaited. On dissecting a pigeon (*Carpophaga*) leaves are found in the crop entire, whereas the food gathered by the kakapo is so finely comminuted as to be found in a kind of felted mass; this, when formed of piki-piki, gives out no unpleasant odour. The kakapo has lately been called the owl-parrot, not an inappropriate name if we consider its nocturnal habits, facial disk, &c.; its

habit of regurgitating certain portions of its food may be added as another reason for its new title.

It is a late breeder apparently, probably deferring family cares till the ripening of certain fruits supplies ample nourishment for the young. The natives of Bruce Bay say that the kakapo descends the ranges when the tuhe (*Coriaria*) is ripe: this is towards the very end of the year.

The nesting-place is usually a hole ready made, or one which requires but little labour to fit it for use,—such a place is often selected amongst roots or dead logs; sometimes its home is tunnelled in the ground; wherever it may be, its condition will scarcely fail to recall the homely proverb about the bird that fouls its own nest. About a year ago the writer inspected a well-excavated home not far from Okarito; it was near the top of a low dry terrace beneath huge katas and kimus, whose stately trunks were clothed with semi-pellucid kidney-ferns and *Hymenophyllum*: there the formal *Gleichenia* grew sparingly, just above pendulous *Aspleniums*, and the heavy fronds of *Todea superba*, that filled the bottom of the gully in one mass of deepest green. The tunnel, six inches in diameter at its mouth, was scratched out of the side of the terrace; the circumference widened very gradually as the excavation extended, the work ending in a chamber, two feet in height by eighteen inches in width; the total length of the hole, from the entrance to the back of the nesting-place, was found to measure nine feet. The floor was thickly covered with excremental balls, to the extent of between two and three bucketsful, from which we could not detect any unpleasant odour: the fermentation of this mass of vegetable matter would materially assist in keeping the hole warm during the absence of the old bird. This unclean custom of devoting home to cloaca as a peculiar habit of the kakapo, is well known to the Maories, as a certain contemptuous saying proves. It may be noted that these excremental droppings often measure quite, and sometimes exceed, an inch in diameter; the biped unplumed, when on fern diet, extrudes fœces of vast size,—a fact painfully experienced by those who have roughed it out on baked fern.

Three eggs seem to be the usual number to a brood; these laid with a considerable interval, probably, between each deposit: the breeding-season extends probably through the first three months of the year. We have been supplied with a note of a nest having

been found in the month of March on the banks of the Okarito river; it contained one egg and two young birds: another nest, within the distance of a mile from the first, contained two eggs and one young one: this affords some evidence of the deliberate manner in which the eggs are laid. Current with the natives of the West Coast is a piece of folk-lore that the number of eggs laid by the kakapo is indicated by the fruit of the kie-kie (*Freycinelia Banksii*); it is averred the number of eggs to a nest will be found to correspond with the number of cobs that may be found in a spike of the trailing kie-kie.

It is customary with the female to remain with the young whilst the male finds shelter in some convenient nook close by. The sexes show great attachment to each other. A friend informed the writer that in a place where the kakapo was not likely to be found he had killed a female bird: the specimen was carried to his camp, about two miles distant; at night he heard a kakapo, which his dog secured; it proved to be a fine male. This bird he had no doubt was the mate of the female killed in the daytime: he arrived at this conclusion as, from his intimate knowledge of the district, he was perfectly aware it was not kakapo country; the specimens procured were strangers.

All those who have kept a bird of this species as a pet agree in testifying to its intelligence and companionableness.

Much of the interest that attaches to the study of the Natural History of New Zealand is bred perhaps from the contemplation of forms that are now strange to the world of science, and men wax eloquent on such apparent anomalies as wingless or brachypterous birds, whose structure leads the reflective naturalist far into the remoteness of the past. Inhabiting fragments of an ancient continent whose history is so entirely lost as to present a void, without the vestige of a tradition for the investigation of the student of our modern cultivation, these curious forms, their conservation through the grand physical changes in their habitat, are in themselves a most entertaining theme for the pondering naturalist.

It is greatly to be regretted that the peculiar forms that illustrate the fauna of these islands are daily becoming scarcer: the demands of collectors seem to be insatiable. The writer is aware of a whole district from which the *Apteryx australis*, the rowi of the Maories, has been exterminated. In the north of this island a vast white heronry has been destroyed, or forsaken by the kotuku in consequence

of ceaseless persecution. The night parrot is never spared; the skin or skeleton finds a ready market in the Natural History exchange.

T. H. POTTS.

Ohinitahi, New Zealand, March 10, 1873.

Ornithological Notes from Somersetshire.

By CECIL SMITH, Esq.

FOR the first two months of the year I have nothing to say, except that being at the Taunton railway-station one day (I think the 25th of January), I saw that most omnivorous bird, the house sparrow, devouring with the greatest gusto the grease in the pots kept for greasing the wheels. I was rather struck by this, as so many birds have an objection to grease of any sort.

MARCH, 1873.

Razorbill.—On the 11th I had a razorbill sent me from Weston-super-Mare, which had been picked up nearly dead on the rocks, probably starved and driven ashore in one of the gales that were prevalent about that time: it was a small bird, apparently a young bird of last year, still in winter plumage; it had nothing whatever in its stomach. I have noticed this capture, as the razorbill and the guillemot are not very common so high up the Bristol Channel, the water being probably too muddy for them.

Hawfinch.—On the 25th I saw two hawfinches about my own place, and Mr. Mathew shot one of a pair that made their appearance in the Vicarage garden. I cannot, however, quite agree with my friend's remark (Zool. S. S. 3490), that this bird "is nearly as great a stranger in this part of the country as a waxwing," for it is an almost constant winter visitant, though never very numerous, and rather varying in numbers; it also occasionally breeds in different parts of the county. A young bird, only just out of the nest, was picked up dead in the stable-yard of a friend's house, about three miles off, and brought to me on the 26th of June, last year.

Redstart.—On the 25th I saw a male redstart; this is the earliest I have ever seen: last year one was brought to me which had been killed in a garden near here on the 3rd of April, which I then thought unusually early.

Chiffchaff.—The chiffchaff did not make its appearance this year till the 26th, much later than last year, when I saw one on the 9th.

APRIL, 1873.

Sand Martins and Swallows.—Sand martins and swallows made their appearance late this year, as I did not see any till the 14th, when there were several sand martins about and one swallow. On the 15th many of the sand martins, quite fifty pairs, returned to their old holes in my quarry, but were doomed to some disappointment, as I had to remove the part which they had taken possession of last year, in order to get at a new cut of stone. In removing this head I found that a pair of robins had taken advantage of the absence of the sand martins to build in one of their holes, and had already laid two eggs. Some of the sand martins afterwards returned to the quarry and made fresh holes, which they inhabited, and brought up their young, in spite of four men being constantly at work in the quarry and occasionally blasting the rock below with powder.

Cuckoo.—16th. First heard the cuckoo, the same day that it was first heard near here last year.

Blackcap.—19th. First saw the blackcap—a little later than last year, when I first saw one on the 16th.

Summer Snipe.—27th. First saw the summer snipe by my pond, much later than last year, when one was killed near Taunton on the 19th.

Pinkfooted Goose.—On the 27th the pinkfooted goose laid its first egg, in the same place as last year.

MAY, 1873.

Ring Ouzel.—On the 1st I saw a ring ouzel at the Museum at Taunton, which had been killed at Trull, near that place, a few days before.

Transposition of Eggs in Birds' Nests.—During this month I tried several experiments, as suggested by Professor Newton (Zool. S. S. 3473), with a view of ascertaining how far birds in general, and especially some of the foster-parents of the cuckoo, have any objection to eggs of a different colour being placed in their nest. I changed places with blackbirds' and thrushes' eggs; I also placed a robin's egg in the nest of a hedge-

sparrow, and a greenfinch's in that of another hedgesparrow; a greenfinch's egg in the nest of a chaffinch; and a hedgesparrow's egg in the nest of a chaffinch, and also one in the nest of a greenfinch. In all these cases, except the last, the exchange was perfectly successful; in the last case the nest had been found and taken by some one the morning after I had placed the strange egg in it. By successful I do not mean that the strange egg was always hatched, but that the parent bird continued sitting on her own eggs and the strange one quite as well as if nothing had happened; though this is exactly what I should have expected in every case, for I do not think birds are particularly careful about the colour of the egg on which they sit. I think it right to mention that in many cases I placed the strange egg in the nest soon after the bird had begun to sit, but in some cases before, one or two eggs being laid after I had inserted the stranger.

Swift.—On the 6th I first saw the swift.

Landrail.—On the 8th, at the Museum at Taunton, I saw a landrail, which had been killed by flying against the telegraph-wires. On the 13th another landrail was brought to me by the porter at our Bishop's Lydeard station, who said he had picked it up dead under the telegraph-wires. This bird seems to be rather stupid, as I have several times heard of its being picked up in a similar manner in other years.

Birds near Weston-super-Mare.—On the 14th I was on a visit to Weston-super-Mare, and took a long walk along the coast and out to the end of a steep grassy promontory, Bream Down, where I thought it possible I might find some herring or common gulls breeding, but with the exception of four or five herring gulls, which I saw on the mud, and none of which had acquired adult plumage, I did not see a single gull of any sort. Indeed I do not think that either the common or herring gull now breed on any part of our Somerset coast, for last year I was at Weston about the same time and explored the coast for some way on both sides of that place, but though I saw several burrow ducks evidently paired, I saw no gulls; and the year before I had occasion to go from Ilfracombe to Bristol and back during the middle of the breeding season: this took me, of course, along the whole of our coast, and had the gulls any breeding-station there I must have seen it. The same year I rode close along the coast from Danster to Culbone and back, with the same result as to seeing gulls breeding; indeed this

western part of our coast is by no means suited for a breeding-station, the cliffs along the greater part of it being thickly wooded down to the water's edge. On the 5th of June also I walked along a good bit of the coast about Quantock's Head and only saw one herring gull, and that an immature bird; indeed this part of the coast, owing to the crumbling nature of the cliff, would be a very unsafe place for a nest. I cannot help thinking, therefore, after all these expeditions, that Messrs. Sharpe and Dresser, in the 'Birds of Europe,' must have been led into a mistake when they said, *fide* More *fide* Crotch, that the common gull breeds on the coast of Somerset. On the same visit to Bream Down, on the 14th, I saw a flock of about fifteen curlews on the mud, and my wife saw one curlew and a flock of purres near Weston pier. I did not myself see a single small wader of any kind on the muds, though last year about the same time I saw a few purres and a small flock of sanderlings: this was one of the few times I have found sanderlings on our coast, where they do not appear to be common.

JUNE, 1873.

Blackcap, Willow Wren and Redstart.—I made a few notes this month as to the colour of the fauces of nestling warblers, in accordance with a request of Prof. Newton in a late number of the 'Zoologist' (S. S. 3527). I had not much time, however, for nest-hunting, and was not fortunate in finding the nests of warblers. The only three which I was able to find were the blackcap, the fauces of the young of which were a pale pink, and the willow wren and the redstart, the fauces of both of which were yellow. While I was watching for the blackcaps to hatch I frequently found the male bird taking the place of the female and sitting on the eggs whilst she was away, especially if the weather was cold or wet: I had before noticed this, but did not think it was such a regular habit as it appears to be. In the nest of the willow wren I frequently found both the old birds squeezed in lovingly but uncomfortably together, for as the nest was scarcely large enough for both of them the tail of one was generally left sticking out of the entrance-hole.

Pinkfooted Goose.—The pinkfooted goose hatched on the 3rd, but her young ones were almost immediately eaten by rooks, who have been very destructive both to eggs and young birds this year. I was much disappointed at losing the young geese, as I was

anxious to see if the pinkfooted parents would again have produced an orange-legged young one. The orange-legged one mentioned by me in the 'Zoologist' (S. S. 3412) still retains his orange legs, so I suppose he may be considered a real permanent variety, or a reversion to the orange-legged bean goose as the parent species.

Rook.—In the stomach of a young rook which I shot about this time, by way of a terrible example, I found many of the galls from the under parts of the oak-leaves: there were several of them, some quite whole and others partially digested. This was to me quite a new article of rook's diet.

Herring Gull.—On the 13th the tame herring gulls hatched one young bird, and on the next day another. This difference in hatching may perhaps be accounted for by the fact that the old bird began to sit almost immediately after the first egg was laid, probably from fear of her nest being harried by rooks and jackdaws, from whose attacks she had suffered in the two previous years, before she had completed her complement of eggs. The young gulls when first hatched are funny looking balls of brindled down, very soft; the bill and legs are dark, nearly black. The old birds are both most attached to their young and most energetic in their defence, on the slightest show of danger attacking even a stray pig or a cow that comes too near. The mother is also most attentive in feeding her young, reproducing from her throat the last meal she has swallowed, and holding it down in her bill for the young ones to pick at. The young ones are now (June 29th) just beginning to grow their quill-feathers.

CECIL SMITH.

Ornithological Notes from Devonshire.

By JOHN GATCOMBE, Esq.

、 MAY, 1873.

1st. Heard the nightjar in Bickleigh Vale.

3rd. Wind north, and cold. Walked through Bickleigh Vale; found blackcaps numerous and singing. Observed martin, swallow, wood wren, willow wren, chiffchaff, tree lark, gray wagtail, marsh and longtailed tits, dipper, kingfisher, jay and green woodpecker.

4th. Met with several ring ouzels in Tavy Cleve, on Dartmoor. Saw at the shop of a dealer in live birds a nest of young ravens, and was told that the young in two other nests were destroyed by

boys with stones, because they could not get at them. This, it appears, they almost invariably do, and I also heard of a man having shot into a nest at Wembury, near Plymouth, from the same cause.

7th. Wind W.N.W., blowing a gale, and very cold. Saw a swift, and the sedge warbler was heard by a friend.

8th. A flock of whimbrels came in from the sea and flew up the river Tamar. I also saw a specimen which had been taken in a very exhausted state on board ship a week previously.

10th. Went to the cliffs at Wembury, at the entrance of the river Yealm, where I was pleased to find the herring gull breeding, and saw several sitting on their nests, besides a flock of full two hundred, which kept flying round within fifteen yards of my head, uttering their incessant laughing kind of cry until I took my departure. Some would alight singly or form groups on the projecting crags and grassy slopes on the top of the cliff close by, and the effect produced by the snowy plumage of those sitting on their nests or standing among the beautiful tufts of sea pinks was indeed lovely. On my way to Wembury I remarked the following species:—swift, swallow, cuckoo, sedge warbler, willow wren, chiffchaff, wood wren, whitethroat, blackcap and tree pipit.

15th. There was a great show of young rooks at the stalls in the market to-day.

16th. Saw a fine peregrine falcon which had been killed a week before, likewise four oystercatchers shot from a flock of nine in the neighbourhood of Plymouth.

19th. Visited Croyde, North Devon, interesting to me as one of the places frequented by the flock of great bustards in the winter of 1871. All the villagers and country people to whom I spoke on the subject of their appearance persisted in calling them "turkey buzzards," and some whom I suppose had not really seen the birds seemed quite astonished to hear their proper name, and that they were not birds of prey. Possibly some of the sailors of the neighbourhood having talked of the turkey buzzards met with abroad might have caused the name to be thus confounded, or, more likely still, the fancied resemblance of the bird to the turkey and the name to the buzzard caused the mistake. Observed a great many herons and whimbrels on the mud-banks of the river Exe, numbers of sand martins near Exeter, and heard the corn crake close to Barnstaple.

20th. Remarked a knot on the Plymouth Breakwater, which was still in the ash-coloured plumage of winter, or probably a young bird of last year.

22nd. Visited the river Avon, some miles from Plymouth, and watched young gray wagtails flitting about from rock to rock in the river, catching flies almost as well as the old ones, which were in attendance. At an inn near the river I was shown a stuffed phalarope, which had been killed a year or two since when settled on a rather wet spot in the turnpike-road just before the house.

26th. A fine male little bittern was obtained near the river Erme, which I examined just after it had been stuffed. This bird was observed to frequent the river for a fortnight before it was killed.

28th. Examined a beautiful variety of the common blackbird, the colour of which was a delicate grayish buff: no doubt, a young bird of the year.

31st. I again visited the breeding-place of the herring gulls at Wembury, and was pleased to see some downy young ones cuddled together on the ledges of the cliff, outside of but close by the nest, and it was most interesting to observe the instinct shown by these little creatures in keeping so quiet and motionless while danger threatened, hiding their heads in a crevice on the face of the rock, and presenting their backs only, which so assimilated in colour to the yellowish gray or brown of the surrounding objects that they were with great difficulty seen at all. However, by the aid of a good pocket-telescope, I managed to make some sketches of these interesting little families, which consisted generally of three. As there was not the slightest attempt at feeding the young in my presence, I made my visit as short as possible. When taking my departure, about seven o'clock in the evening, I observed a large flock of immature or non-breeding birds coming overland from the rivers and estuaries in the neighbourhood of Plymouth, which they frequent by day, but they repair to the high cliffs and rocks on the coast towards night.

JUNE, 1873.

2nd. A night heron, in the plumage of the second year, was obtained on the river Erme, near Ivybridge, Devon, which I examined in the flesh. This makes the ninth specimen secured from the same locality since the spring of 1849, every bird of which

I examined, and all were adult, with the exception of the last named. The females closely resemble the males in plumage, but have the occipital plumes shorter, those of the males being six inches and those of the females about three inches in length. When at rest these birds generally concealed themselves among the foliage of alder and sycamore trees, but the last one was on several occasions flushed from an orchard in the vicinity of the river. They also sometimes perched on dead branches in a conspicuous situation. The stomachs of some contained the remains of small fish and eels, the slime of the latter remaining about their beaks.

3rd. Observed several young gray wagtails and young water ouzels on the stones and rocks in the river Tamar.

10th. Visited the collection of stuffed birds at Port Eliot, the seat of the Earl of St. Germans, and among the specimens was pleased to see the original cravat or Canada goose, figured and described by Bewick; and at the rectory close by, the incumbent of which is the Rev. — Furneaux, I had the opportunity of seeing a fine immature specimen of Sabine's gull, which was accidentally killed at night by a wild-fowl shooter among a flock of curlews resting on the mud-banks of the St. Germans river.

14th. Observed many wood larks on my way to Weston Mills, near Plymouth, and was much struck with a habit they had of selecting a bare patch of earth to alight on, if ever so small, which assimilated with the colour of their plumage, so that at times they were hardly visible at a very short distance.

20th. Again visited Bickleigh Vale, and heard garden warblers, blackcaps and willow wrens singing constantly. Swifts were plentiful, flying high over the woods at Cann Quarry. Both swifts and house martins have been numerous in the neighbourhood of Plymouth during the present season, but I cannot say the same of the swallows and sand martins.

23rd. Went with the Rev. Courtenay Bulteel to see the stuffed birds at Blatchford, near Ivybridge, the seat of Lord Blatchford, and examined a beautiful nearly adult specimen of the squacco heron (*Ardea ralloides*), which was killed by the side of a large pond close to the house, in June, 1840. The date of its capture and the name of its preserver, Mr. Drew, then living at Stonehouse, were written on the back of its case.

26th. Observed a pair of rock larks carrying to their young a

small species of chaffer, this insect being just now very numerous about the cliffs on the sea coast.

28th. Remarked a fine male common redstart perched for some time on the telegraph-wire, and uttering a constant plaintive note, which was answered by the female in some bushes by the river side. I think the young must have been near also, but I did not see them. I merely mention this as the common redstart is so *un-*common in our neighbourhood.

30th. Saw, at a birdstuffer's, an old female and two young kingfishers which had been killed on one of our rivers a few days before, notwithstanding the Wild Birds Protection Act. The young birds varied very little from the old one, except in being smaller, and having a much shorter bill. The lesser blackbacked gulls left our harbours very late, but I cannot find them breeding on any part of the coast in our neighbourhood.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth.

July 3, 1873.

Wild Birds Protection Act.

By the Rev. O. PICKARD-CAMBRIDGE, M.A.

IF Professor Newton read my remarks on this Act (Zool. S. S. 3576) with *sorrow*, I must say I have read his reply to them with *surprise*. Immediately after the appearance of my remarks in the 'Zoologist' I received a note from Mr. Newton, substantially (in fact, almost verbally) similar to the reply communicated to the 'Zoologist' (S. S. 3611). Perceiving from his note that Professor Newton had misunderstood me to attribute the Wild Birds Protection Act *as it was brought forth* (*i. e.* passed in Parliament) to the authors of the Wild Fowl Protection Bill, I immediately wrote to him in explanation of my remarks on that head, as well as on other points: my surprise is therefore naturally great to find that he still credits me with what I fancied I had plainly disclaimed. I feel therefore obliged to trouble you with a few words by way of rejoinder on this subject.

Few readers of my remarks (Zool. S. S. 3576) would, I should have thought, have missed the distinction intended, and clearly implied, between the *conceivers* of the Act—*i. e.* the authors of the

Wild Fowl Protection Bill—and the *bringers forth*—*i. e.* the parties who brought it into the form under which it was passed as the Wild Birds Protection Act.

Professor Newton tells us that the “conceivers” were *not* “sportsmen,” nor the “bringers forth” “ornithologists many generations behind the time”; but it is not clear from his letter in the ‘Zoologist’ (S. S. 3611) whom *he* intends as the *bringers forth*, though he appears to include *himself* among them; I, however, certainly did not either so intend nor include him, nor any of those gentlemen whom he names as the authors of the Wild Fowl Protection Bill. I need hardly say that I was, until the receipt of Professor Newton’s communication, utterly ignorant of the *names* of any one concerned with either the *conception*, or the *res nata*, except that of Mr. Auberon Herbert.

With regard to the term “sportsmen,” it appears to be considered objectionable, and of course, on Prof. Newton’s statement, I retract it at once. Not having the advantage, at the time, of knowing the names of the conceivers, the term *sportsmen* was used on the internal evidence afforded by the conception itself—arguing, in fact, from the nature and scope of the Bill to its authors. Some other evidence of a collateral nature also supported the argument. I freely admit that it would have more accurately expressed what I intended had my words been, “It appears to me from internal and other evidence that the Act itself,” &c., &c. I do not see, however, that my misapprehension of the interesting fact of the conceivers not being “sportsmen” affects the merits of the case. Whether they intended it to do so or not, their conception undeniably bore so strongly the impress of a *Game Act* that they must, I still think, have been exceedingly “short-sighted” not to have foreseen the impossibility of passing it in that form. As to those who got hold of the conception and “brought it forth” in the shape of the Wild Birds Protection Act, whether they are or not “ornithologists in any sense,” I still believe them to have been certainly “behind the times”; but as Professor Newton does not defend them there is no need to say much on this part of the subject; indeed, from his communications to me, he seems to have a far lower opinion of them than I either have, or have expressed.

Before concluding, however, I must make one further remark. Prof. Newton says he has “nothing to do with my *opinions*,” but

what he adds immediately after, as it misrepresents them, seems scarcely consistent; especially after I had explained the grounds on which I thought the Act to be "objectionable in principle." Whether conceived by *sportsmen* or not, the Wild Fowl Protection Bill was, as it appeared to me, virtually a *Game Act*, and undoubtedly I hold *all* Game Acts to be objectionable in principle, though under certain circumstances tolerable in practice; objectionable, too, the Wild Birds Protection Act seemed to me, because, among other reasons, its aim was to prohibit unduly the liberty of the subject in the destroying even of noxious birds. Now I cannot see that the regulation in Deut. xxii. 6, 7, has the remotest suspicion of being either a Game Act or an undue interference with the liberty of the subject. I do not therefore for a moment admit my argument against the Wild Fowl Protection Bill and the Wild Birds Protection Act to be equally an argument against the Mosaic prohibition: this prohibition was against ruthless extermination and cruelty; but it is yet quite consistent in its principle, with the fullest necessary liberty to keep noxious birds within bounds, provided cruelty and ruthless extermination are avoided. *These* are, it seems to me, the sole points to which legislation ought to be, or can be, directed in these days: on these points a full and free discussion cannot be otherwise than beneficial; and it will, I think, greatly conduce towards the object we *all* have in view—*i. e.* the reasonable, just, and humane treatment of birds.

O. P.-CAMBRIDGE.

Bloxworth Rectory, July 3, 1873.

Notes from the Brighton Aquarium.

By W. SAVILLE KENT, Esq.

1. *The Intellect of Porpoises.*—A single visit to the Brighton Aquarium would suffice to convince a recent correspondent, Mr. Mattieu Williams, that the intellect of the porpoise, as foreshadowed by its convoluted brain, exceeds, beyond comparison, that of the cod-fish or any other representatives of the piscine race. Of the two specimens now inhabiting the largest tank in the building, over one hundred feet long, the first-comer so readily accommodated itself to its altered conditions, that on the second day it took its food, smelts and sprats, from its keeper's hand, and

has continued to do so ever since. The later arrival was, at first, less sociably inclined; but both have latterly become equally tame, and frequently, while receiving fish from my hand with the gentleness of pet dogs, have permitted me to pat and stroke their slippery india-rubber-like backs. During feeding-time it is amusing to watch the avidity with which these porpoises take their food; one, the more active of the two, usually securing the lion's share, and displaying marked sagacity by frequently snatching a second or third morsel before disposing of the first. The keeper in charge of these interesting animals is now in the habit of summoning them to their meals by the call of a whistle; his approaching footsteps, even, cause great excitement in their movements, and recent experiments have proved them to be acutely sensitive to the vibrations of sound. By the physiologist a more pleasing spectacle can scarcely be witnessed than the graceful actions of these Cetacea, as they swiftly pursue their course up and down their spacious tank, ascending to the surface of the water at intervals of fifteen or twenty seconds, to breathe, each inspiration being accompanied by a spasmodic sob-like sound, produced by the rush of air as a breath is rapidly liberated and inspired through the single central blow-hole. Onward progress is effected in these animals, as in all other Cetacea, exclusively by the action of the horizontal caudal fin; the development of muscle at the "wrist" of the tail on which this action depends being enormous and plainly visible externally; the pectorals are devoted principally to the purpose of steering the creature to the right or left, aiding it also in rising to the surface of the water. The fact alone of the porpoise suckling and evincing much maternal solicitude for the welfare of its young indicates the superiority of its position in the zoological scale above that of the other representatives of the funny tribe; and to this, in addition to the remarks just made upon their sagacity when feeding, many other facts may be cited, pointing in the same direction. The curiosity attributed to these creatures, as illustrated by the experiences of Mr. Mattieu Williams, receives ample confirmation from their habits in confinement. A new arrival is at once subjected to the most importunate attention, and, advancing from familiarity to contempt, if disapproved of, soon becomes the object of attack and persecution. A few dog-fish (*Acanthias* and *Mustelus*), three or four feet long, placed in the same tank, soon fell victims to their tyranny, the porpoises seizing them by their tails, and swimming

off with and shaking them in a manner scarcely conducive to their comfort or dignified appearance, reminding the spectator of a large dog worrying a rat. The fine sturgeon, six feet long, now sharing an adjoining tank with the cod, was first placed with these animals, but in a short time was so persecuted that for safety it had to be removed; while to this day the lacerated condition of its tail bears witness to the pertinacious attention of its former comrades. Some large skate (*Raja clavata* and *maculata*), while they maintained their usual habit of lying sluggishly on the floor of the tank, escaped molestation; but no sooner did these fish display any unwonted activity than the porpoises were upon them, and, making a convenient handle of their characteristic attenuated tails, worried them incessantly. On one occasion I witnessed the two Cetacea acting evidently in concert against one of these unwieldy fish, the latter swimming close to the top of the water, and seeking momentary respite from its relentless enemies, by lifting its unfortunate caudal appendage high above its surface. It need scarcely be remarked that the skate were removed before further mischief could be done, leaving the porpoises, with the exception of a few conger, which during the day-time mostly lie hidden in the crevices of the rock-work, turtles, and a huge monk-fish (*Rhina squatina*) sole occupants of this colossal tank. While far behind the porpoises in display of intellect, it may be hereafter shown that the representatives of the Gadidæ, or cod family, are by no means the least intelligent of fish.—*Reprinted from 'Nature' of July 17, 1873.*

2. *Difficulty with Mackerel.*—Up to within the last few weeks, a single mackerel has been the only representative of the Scombridæ in the Brighton tanks. This specimen was added to the collection, in company with several others, towards the close of the last season, and proved to be the only survivor through the winter. The difficulties attending the preservation of these delicate pelagic fish, on account of their extreme susceptibility on exposure to atmospheric air, and the reckless impatience of confinement they usually display when first imprisoned within the limits of a tank, occasioned a high value to be set on this solitary captive, and one only rivalled perhaps by that attached to the small shoal of herrings occupying an adjoining tank in the same corridor. During the early spring and summer months the mackerel taken on this coast are caught many miles out at sea by means of "drift nets" fastened across the course of the current, and having the meshes of sufficient

size to admit the fish's head up to the neck. These nets are laid down overnight, and when drawn up towards the morning are found, if circumstances have been favourable, to have intercepted vast shoals, each individual fish being retained by its gills. Life necessarily becoming extinct, from the position in which the fish are held before they are drawn out of the water, this mode of their capture becomes useless for aquarium purposes. As the summer and calmer weather advances, the mackerel come into shallower water, permitting the use of the finer-meshed seine-net from the shore; and it is only when taken by these means, or on hooks, that there is any chance of conveying them in a living condition to the tanks. Even then only half the difficulty is overcome, the fish being so impatient of confinement that they usually endeavour to effect their escape by dashing heedlessly against the rockwork or front glass of their tank. The majority speedily kill themselves in these attempts, and the remainder usually injure themselves to such an extent as to outlive their comrades but a few days. One specimen captured last autumn survived the most remarkable injuries far into the present year, taking its food and exhibiting an amount of activity equal to that of its uninjured companion. In this instance the fish had dashed its head with such violence against the rockwork that the anterior facial bones were forced in upon one another, rendering the usual pointed contour of the snout perfectly obtuse, and bending it at the same time in a strong curve towards the left shoulder. During the past fortnight the mackerel have again approached the coast, and several dozen living examples have been conveyed to the Brighton tanks. From the causes already given, but few of these are now on view, though some six or seven are doing well, and seem disposed to take kindly to the altered conditions in which they are placed. The survivor from last autumn now proves of remarkable service, acting like the tame elephants or "komkies" in repressing the wild fury of the new captives. The mackerel recently caught have been allotted to several tanks, but in none have they done so well as in that containing the acclimatised individual. However wild they may be when first introduced, amicable relations seem to be at once established between this specimen and the new comers; the latter now quietly settling down, and tamely following it in its graceful evolutions round the confined boundaries of their new abode.—*Reprinted from the 'Field' of July 19, 1873.*

3. *Successful Breeding of the Spiny Lobster or Sea Crayfish.*—Among six fine specimens of the “spiny lobster” or “sea crayfish” (*Palinurus vulgaris*), added to the collection about a month since, was one female individual in the “berried” condition, the lower surface of her abdomen being completely hidden beneath the masses of bright orange-coloured ova. During the last few days these have arrived at maturity, and, bursting, liberated the tiny embryos in countless swarms. So transparent are the individual members of this infant progeny, that it is only on a close approach to their tank (No. 26) that they can be detected; while the friendly aid of a passing sunbeam is requisite for the full appreciation of their accumulated numbers. In the early stage of their existence the young crayfish are so unlike the parents from which they spring that they were long regarded as the representatives of an entirely different order of Crustacea, named Phyllosoma, on account of their flattened, leaf-like bodies, and classified with Squilla, Mysis, and their allied species under the order of Stomapoda. The Belgian naturalist Ed. van Beneden was one of the first to elucidate the true position of this anomalous form, and the valuable results of his investigations are now most amply and satisfactorily confirmed. The little fellows swarming in the Brighton tanks are at present of very minute size compared to the Phyllosomæ brought from tropical seas, the whole area occupied by their outstretched legs, which form by no means the least conspicuous portion of their organization, scarcely exceeding half an inch. Their flattened, transparent bodies seem ill capable of permitting much liberty of action, the whole swarm being carried about almost at the entire mercy of the current produced by the stream of air constantly supplied to the tank. When individuals closely approach the front glass it can be seen that they possess a little freedom, restricted principally to elevating or lowering themselves in the water, and that the weak progress they make is effected by the constant vibration of the exopodites or filamentous processes of the three median pairs of limbs, and which, with the aid of a pocket lens, may be discerned, through the thick plate-glass separating them from the observer in the corridor, to be densely clothed with fine hair-like setæ. In aspect the little fellows, as they are borne along with the extremities of their attenuated limbs tucked beneath them, much resemble certain representatives of the spider tribe, and more especially the slender aquatic forms familiar to naturalists as

Pycnogon and Nymphon. Although colour is very inconspicuous at present in this Phyllosoma stage of the crayfish's existence, it is not altogether absent, two dark pigment spots marking the position of the eyes on their long footstalks, while in many individuals the more prominent joints of their slender legs may be seen in favourable lights to be delicately banded with bright orange or vermilion. The habit of lying with its legs extended at the surface of the water, which is attributed to Phyllosoma as encountered in the Atlantic and other seas, seems to be acquired only at a later period of its existence. The singular form and structure of its body and radiating limbs fit it remarkably for this mode of life, and a somewhat similar adaptation of means to the same end is met with in *Gerris* and *Hydrometra* among the heteropterous Hemiptera. In the typical invertebrate series of the Museum of the Royal College of Surgeons are some remarkably fine tropical Phyllosomæ, several inches in length, which, while they yielded the highest amount of interest and gratification during examination, puzzled me to no small a degree as to the manner in which they should be mounted to illustrate their singular forms to best advantage. The difficulty was met by sewing their bodies with fine silk to a thin plate of talc, each attenuated appendage being fixed in place by the same means. On the whole being immersed in spirit in the glass selected for their reception, the fluid rendered the talc perfectly invisible, while the shape and structure of the Phyllosomæ were most satisfactorily exhibited.—*Reprinted from the 'Field' of July 19, 1873.*

[It is with extreme pleasure that I have read these additions to our knowledge of living marine animals, a subject on which we have been so long and so lamentably ignorant. Mr. Kent is in an excellent position for acquiring knowledge of this kind, and these contributions exhibit him not only as a careful observer but an able recorder of observations, two of the most essential qualifications of a naturalist.—*Edward Newman.*]

Supposed Identity of Lakes Tanganyika and Albert Nyanza.—"I have further a most important geographical discovery to communicate, one which cannot fail, I think, to astound many scientific men in England. It is declared as an ascertained fact by the returning party that lakes Tanganyika and Albert Nyanza are proved to be one and the same water: the length of this magnificent inland sea, thus for the first time made known to mankind,

is not less than seven hundred miles, and it is announced as a positive fact that a vessel can be launched above Murchison Falls, at the head of Lake Nyanza and sail away to Ujiji, or lower, through ten degrees of latitude. * * * I send you this intelligence direct from the lips of the Emancipator of Central Africa."—*Extract from the 'Daily Telegraph' of July 8, 1873, received from "Our Own Correspondent."*

[The "details" of the journey southward and of the return journey northward are too meagre to deserve that name. Eager as all are to receive news of Africa and African explorers, we must exercise caution both in accepting or rejecting such information as this; its bearing on the colonization, the investigation, the mercantile and Natural History future of Central Africa, are incalculable.—*Edward Newman.*]

The Anatomy of the Negro.—"I have pointed out over a hundred specific differences between the bonal and nervous system of the white man and the negro. Indeed, their frames are alike in no particular. There is no bone in the negro's body which is relatively the same shape, size, articulation, or chemically of the same composition, as that of the white man. The negro's bones contain a far greater proportion of calcareous salts than those of the white man. Even the negro's blood is chemically a very different fluid from that which courses in the veins of the white man. The whole physical organization of the negro differs quite as much from the white man's as it does from that of the chimpanzee—that is, in his bones, muscles, nerves and fibres, the chimpanzee has not much farther to progress to become a white man. This fact Science inexorably demonstrates. Climate has no more to do with the difference between the white man and the negro than it has with that between the negro and the chimpanzee, or between the horse and the ass, or the eagle and the owl. Each is a distinct and separate creation. The negro and the white man were created as specifically different as the owl and the eagle. They are designed to fill different places in the system of Nature. The negro is no more a negro by accident or misfortune than the owl is the kind of bird he is by accident or misfortune. The negro is no more the white man's brother than the owl is the sister of the eagle, or the ass the brother of the horse. How stupendous and yet how simple is the doctrine that the Almighty Maker of the universe has created different species of men, just as He has different species of the lower animals, to fill different places and offices in the grand machinery of Nature."—*Professor Agassiz, as quoted in the 'Popular Science Review.'*

A Dog eating Stoats.—During a walk on the 20th of May in some marshes near the sea, our two dogs found and scratched out a nest of young stoats by the side of a ditch next to a large piece of reeds; there

were four or five of them, and about half-grown. One of the dogs, a smooth terrier, immediately began eating them with the greatest relish, and I only just managed to get to the place in time to snatch up the last of them: after examining it I threw it to him and it went down almost whole. On our way home he picked up and swallowed a mole. I have often seen this dog eat half-grown and three-quarter grown rats (*M. decumanus*), and water rats he will sometimes eat when quite full-grown, but I never saw him appear to enjoy anything more than he did the above-mentioned high-flavoured animals. A good many snipe, ducks, peewits, redshanks, waterhens, &c., are now breeding in the immediate vicinity of the stoat's nest, and most of them already have young ones (some of the young ducks have begun to get their feathers); the havoc these destructive animals make among them must be very great.—*G. T. Rope; Leiston, Suffolk.*

Criticisms on Mr. Durnford's "Ornithological Notes."—In the July number of the 'Zoologist' (S. S. 3601—3606) are some ornithological notes by Mr. H. Durnford. In more than one instance in which this gentleman appears to have gained his information second-hand, I am inclined to hazard the opinion that he has been misinformed; if not, he gives me, and I dare say some other readers of the 'Zoologist,' very startling information in regard to the breeding of the Sandwich tern on the coast of Lancashire. Quoting from the article referred to, I find the following:—"On my visit in May I found the young had flown and left the neighbourhood with their parents." Mr. Durnford informs us that he visited Walney Island on the 31st of May last; he does not give the date of the young Sandwich terns leaving the Lancashire coast, but mentions it as an accomplished fact. I do not think I should be drawing an incorrect conclusion if I surmised that these birds must have been hatched by the 1st of May, supposing that they left with their parents towards the end of the same month; a period of three weeks for laying and hatching the eggs, brings the date of deposition of the first egg to the beginning of April; the preliminaries of courtship, selection of nesting-place and preparing nest occupies several days with the terns, which lands us in March—a remarkable time for the appearance of Sandwich terns on our coasts. A correspondent informed me this season that a flock of over forty of these birds appeared towards the end of May at the embouchure of a river on the east coast of Scotland, and he was in hopes that they had come to breed in the neighbourhood, but by the second week in June they had all betaken themselves off, apparently dissatisfied with the locality, to the great disappointment of my informant. I consider it highly probable that the same occurrence took place on Walney Island, which gave rise to the supposition that these terns had bred, reared their young,

and departed, unless we suppose wilful misrepresentation on the part of Mr. Durnford's informant. In Mr. Durnford's note on the herring gull I must also take exception to the following passage, referring to their nesting on the South Stack, Holyhead:—"These birds arrive and depart regularly at the same time in the spring and autumn, and are very jealous of their tenements, not allowing even their own young to nest amongst them." What does this mean? How can any person be sure that adult birds now nesting on the South Stack were not originally reared on the same spot? Mr. Durnford's note in reference to the breeding of *Tadorna vulpanser*, *Flem.*, received by him at second-hand, is not quite intelligible to me:—"During the time the female is incubating, after feeding, she, in company with the male, flies to the neighbourhood of her nest, and after circling once or twice in the air over the spot, to see whether the coast is clear, flies straight into the hole without alighting on or touching the ground; and the mallard, after performing one or two more circles, flies off to his breeding-quarters on the extensive sandy flats of Walney." I presume that by "mallard" Mr. Durnford means the shieldrake, but this name is usually applied to the male of *Anas boschas*, *Linn.*; "breeding-quarters" is doubtless a misprint for "feeding-quarters"; but I think, without laying myself open to the charge of captiousness, the readers of such an extensively circulated periodical as the 'Zoologist' are entitled to a little more care in the preparation of the articles than has been shown in the one I refer to.—*H. W. Feilden; Woolwich.*

Birdsnesting and the Wild Birds Protection Act.—It will be remembered that in the number of the 'Zoologist' for July (S. S. 3615) I had a short note concerning hedgesparrow's eggs laid upon the ground: to this I now have to add one or two additional facts. On May 13th, a relation of my wife's found the egg of a whitethroat, quite freshly laid, in the middle of a flower-bed at Sittingbourne (this was surely an "early bird," for I have never found the nest of a whitethroat before the last week of May); two days later I found the egg of a song thrush in the middle of a strawberry-bed in a clergyman's garden; and as the owners of both gardens jealously protect all the nests built on their premises, it is evident that the eggs in both cases were laid by birds whose nests had been built elsewhere, and which, being disturbed, had been driven to the commission of this unnatural act. The fact of finding eggs thus on three occasions within four days, as also the fact that in one morning subsequently I found seventeen nests, in the whole of which number I only found two eggs, caused me to make inquiries amongst my friends in the neighbourhood, and I then learned from several sources that the farmers, being disgusted at the passing of the Wild Birds Protection Act, which deprived them of the satisfaction of destroying the birds (which they firmly believe do more harm than good to their crops), had employed their boys to collect and smash up all the eggs in their grounds; the small

woods in the vicinity of farms and the hedges skirting the fields had consequently been thoroughly ransacked, and nests lay about everywhere, besides the many empty ones which still remained *in situ*.—*A. G. Butler; British Museum, June 30, 1873.*

Dead Birds at Sea.—But what most interested us was the number of dead birds we passed, amongst which we recognized the hoopoe, quails, wheatears and kestrels. Now the strange thing was that many of these were found within four or five miles of Sicily, and as the weather had been fine and calm for several days one can hardly suppose they had dropped into the water from sheer exhaustion.—*J. S. Walker; Yacht "Aline," Palermo, April 5, 1873.—From the 'Field.'*

Summer Visitants in West Cumberland.—The following are the dates upon which the species were first observed. The extreme lateness of some of the dates seems due to the general scarcity of birds here, and the ungenial weather during April. April 23rd, willow wren; 29th, tree pipit. May 3rd, whinchat; 5th, cuckoo and grasshopper warbler; 6th, swallow; 7th, common sandpiper; 8th, sedge warbler, house martin, sand martin and nightjar; 9th, wheatears; 10th, common whitethroat; 12th, landrail and wood wren; 13th, garden warbler; 14th, swift; 15th, whimbrel; 16th, spotted flycatcher. Yellow wagtails were not observed until the 24th of May, and the blackcap and chiffchaff not until the 26th; but these three species are quite scarce.—*F. D. Power; Cleator, Cumberland, June 9, 1873.*

On *Aquila bifasciata* and *A. orientalis*.—I have long had in my possession two specimens of *Aquila orientalis*, *Cab.*, one sent me by Dr. Bree and labelled by Mr. Gurney, and the other from Mr. Dresser. The latter is a *Sarepta* specimen from the Volga region, and the former from the Dobrudscha. On returning the Dobrudscha example, which Dr. Bree had submitted to Mr. Gurney, the latter sent the following memorandum:—"The eagle which I have ticketed '*Aquila orientalis*, *Cab.*,' is identical with that so often sent in collections from *Sarepta*, near the mouth of the Volga, and is, in fact, the only species of eagle which I have seen from that locality. I have hitherto been in the habit of calling this eagle '*Aquila clanga* of Pallas,' but as Pallas does not appear, by the description of his *Aquila clanga* in the Zoog. Ross. As., vol. i. p. 351, to distinguish between this eagle and the smaller spotted eagle, *A. nævia*, and as his measurements, which are given in old French feet, inches and lines (for a scale of which see Finsch and Hartlaub's *Vögel Ostaf.*), agree better with *A. nævia* than with the present species, it will perhaps be best to adopt for the present species the name of *Aquila orientalis*, proposed by Cabanis in the *Journal für Orn.*, 1854, p. 369 (note), which, though not very well chosen, is the next in order of priority, and the earliest that can with certainty be applied to this eagle exclusively. The specimen now sent appears by its measurements to

be a female, and is in adult plumage; the immature birds of this species being spotted in precisely the same manner as those of *Aquila nævia*, which is well shown in Yarrell's figure of the spotted eagle." I quote this memorandum by Mr. Gurney to show upon what good authority one of my specimens is named *Aquila orientalis*; and the other, sent me by Mr. Dresser, labelled "*A. clanga*, Sarepta," closely resembles it. Mr. Gurney's statement, that the immature is spotted like *Aquila nævia*, is, as far as I can see at present, a mistake; for we have the bird in India (*A. bifasciata*), and it never in any way resembles *A. nævia*. I have, from the first, been struck by the great similarity of these two specimens to our Indian *Aquila bifasciata* of Gray and Hardwick; but had not till the other day obtained Indian specimens according in every respect, to a feather, with the European examples of *A. orientalis*, above referred to. Now I have, and the accordance is so beautifully perfect that there is no alternative but to come to the conclusion that *A. orientalis* is identical in every respect with *A. bifasciata*.* I have now, therefore, three European-killed examples of *A. bifasciata*, the third being that sent me by Capt. Elwes, and referred to in 'Stray Feathers' (vol. i. p. 291). The two first are in nearly mature plumage, and the third is quite mature, and is the finest specimen of the bird I have seen. The two sent as "*A. orientalis*" have only slight indications of the nuchal patch; otherwise I should have recognized them at the first glance as *A. bifasciata*, as was the case with Capt. Elwes's Bosphorus bird. This term has, I believe, priority over *A. orientalis* of Cabanis, and if so will be retained for this eagle. The application of Pallas's term "*A. clanga*" to the same species by some European writers is, I believe, an error, if I read the original description correctly. It appears to refer to our Indian spotted eagle which we accept as *Aquila nævia*, and which I believe to be the true *nævia*. Klein, whose work is dated 1750, is the author of the term *Aquila clanga*, and Pallas quotes and adopts this synonym in preference to the older term *Aquila nævia* of Schwenckfield. This term Pallas quotes under the head of *Aquila clanga*, but as a synonym. Schwenckfield's work is dated 1603. In a letter received the other day from my friend Mr. Anderson, he records the occurrence of a lineated *A. Mogilnik* at Aden, which was stunned by flying against the telegraph-wires there. I may as well mention here that the Indian imperial eagle, to which I applied Hodgson's term of *A. crassipes*, is identical with the East European bird, *A. Mogilnik*, better known as *A. imperialis*, but the former is the prior

* [Mr. V. Ball and I had the pleasure of comparing the two specimens of *Aquila orientalis*, referred to by Mr. Brooks, with a series of Indian *A. bifasciata*. They undoubtedly appear to be perfectly identical, both in structure and coloration. If the determination of those two specimens as *A. orientalis* is *correct* (and upon such good authority as Mr. Gurney it ought to be), there can be no doubt that the two species must be considered as identical.—*F. Stoliczka*.]

term. I compared our bird with an adult Turkish specimen sent me by Dr. Bree. Mr. Gurney also came to the same conclusion, after comparing the adult Indian birds, I had sent home, with European examples. The West European imperial eagle is, however, quite distinct, and is now known as *A. Adalberti* of Brehm. This is the species said to have no lineated stage, and having, when adult, an excess of white on the scapulars and ridge of wing. I sent a fine series of our Indian *Aquila hastata* to the Norwich Museum. Mr. Anderson also sent one example in mature plumage. Besides these we sent others to ornithological friends. I hear from Messrs. Gurney and Dresser that the adult plumage of this species is not to be distinguished from that of the small Pomeranian spotted eagle which *they* term the true *Aquila nævia*. They assert, however, that, though the adults are alike, the immature birds differ. This is a point for further investigation, but the perfect accordance of the adults leads me to expect the same in the immature birds. The connection between the immature and the adult is the first point to be established, and this can only be done by the field naturalist. One of my ornithological friends informs me that the immature of *A. orientalis* (which we have shown is *A. bifasciata*) has spotted plumage like that of *A. nævia*; another friend informs me he has received the immature bird, and it "is strangely like *A. bifasciata*!" Now the latter eagle is *not spotted*, and the "doctors," who are both men of repute, "differ." These points will all be cleared up, it is to be hoped, before long; and we shall perhaps have the natural history of the eagles as clear and as correct as that of the common rook, with little or nothing else to be learned. At present the eagles appear to be in a state of dire confusion, which the English naturalists are daily making worse.

PS.—Since the foregoing was written Capt. G. F. L. Marshall, who is much interested in this subject, came and examined the series used. He fully concurred in the identification of *A. orientalis* with *A. bifasciata*, and was even more positive than I was that the Danzig-killed *Aquila hastata* was indeed that species. It will be remembered it was sent to me labelled "*A. nævia*." My English ornithological friends with whom I communicated are incredulous regarding my identifications, and I therefore refer to my friend's corroboration. If all fails to convince them I shall have the series exhibited at a meeting of the Zoological Society.—*W. E. Brooks, C.E., Assensole, in the 'Journal of the Asiatic Society of Bengal'* (vol. xlii. pt. 2, 1873). [Communicated by C. R. Bree, Esq.]

Blackbird nesting on the Ground.—The nesting of the blackbird on the ground is much more common than is generally supposed. Three instances have come under my observation this season: the most remarkable is one in the park, under a small log of wood; the place first fixed upon was at the side of the log, and the nest was nearly finished, when it seemed to have

been trodden upon by the cattle, and abandoned; but almost close to it another nest has been placed under the end of the log, which now contains four eggs: all around the place is short grass. Last year I found a nest in a fir plantation, placed at the root of a solitary tuft of grass; the ground for some distance from the nest was quite level and bare. I have seen this season the nest of a missel thrush only two feet from the ground, placed in the fork of a slender thorn, quite bare, and close to the roadside. I went to examine the young just before they were fledged, and was rather surprised to find a young blackbird amongst them; there were three thrushes. The nest, when I first saw it, contained four missel thrush's eggs, so I think that some one had taken an egg of the thrush and put a blackbird's egg in its place. The birds all left the nest at the same time, though the blackbird was not so fully feathered. I was in hopes it would be left behind, as I was wishful to see whether the thrushes would feed it after their own young had left the nest. I do not know of any birds that are less particular in the choice of a nesting-place than blackbirds and thrushes are.—*John Sclater; Castle Eden, Durham, June 10, 1872.*

Redstart nesting on the Ground.—Whilst in pursuit of *Argynnis Euphrosyne*, a redstart flew out from the bottom of a small bush, and on looking I found a nest, containing six eggs, built on the ground amongst the thick herbage, &c., under the bush; on withdrawing to a little distance the bird returned to the nest again, so that I am certain of its identity. I have known perhaps of hundreds of redstarts' nests, but never found one on the ground before.—*John Kempster; Clifton, Bristol.*

The Nightingale.—I know not whether the one-sided Act for the protection of our wild birds is the cause, but this season the nightingale has been unusually abundant in the neighbourhood of Ringwood, and several nests have been found in close proximity to our little town. Many persons who had never before heard the notes of this lovely songster are now quite familiar with its "jug, jug, jug," and the varied harmony of its almost ceaseless song. During the latter part of April and the greater half of May the notes of this bird were to be detected at almost any hour of the night or day. Strange to say, the species did not seem to be commoner than usual in the woods, but only in the gardens close to the abodes of men. Many times did I listen to the song, feeling the entire force of the beautiful lines of Coleridge:—

" 'Tis the merry nightingale
That crowds, and hurries, and precipitates
With fast thick warble his delicious notes,
As he were fearful that an April night
Would be too short for him to utter forth
His love chaunt, and disburden his full soul
Of all its music!"

—*G. B. Corbin; Ringwood, Hants.*

[*Editorial Query.*—What is the ruling motive for song in birds? In the domestic cock, in the robin, in the missel thrush, it seems very like a challenge to all the males of the same species to come and have a fight. I cannot regard it in the poetic and sentimental light; to me it does not seem a hymn of praise to the Creator, or a ditty addressed to a lady love.—*E. Newman.*]

Migration of the Sky Lark.—Some years ago, when we experienced a very heavy fall of snow, I noticed this species migrating in countless hundreds from north-east to south-west. They flew comparatively low, and their only business seemed a hasty retreat to a more congenial and hospitable neighbourhood. They made little noise during their journey, but their numbers must have been unlimited, as they were passing the whole of the day, and even in the evening twilight I could still detect the migration going on. This season I have again noticed similar flights, not so extensive, but under exactly similar circumstances. The first fall of snow we had in February, when the ground became covered, was the signal for their transit, and accordingly the migration took place immediately. Their numbers must have been augmented by arrivals from the north, for, although a common species in Hampshire, I scarcely think all I saw were bred in this neighbourhood. As before observed, these took a direction from north-east to south-west, and I saw few, if any, after the first day's migration. During the fall of snow at the end of February (when it covered the ground to its greatest depth), I did not observe any further migration, and in no case have I seen the birds return northwards. On each occasion of seeing these migrations the flight has been directed in the same course, away from the open fields and hills to the fir-woods on the opposite side of the river. It will perhaps be asked, Is it possible that the birds could have taken advantage of the shelter afforded by these woods? I think not, as their flight, if from any great distance, must have been across the extensive woods of the New Forest before reaching us, where ample shelter, but little food, could be obtained, so I suppose that hunger is the whole and sole cause of these migrations, as I never observed it except when the ground was "snow-clad." In severe frosts I have seen the birds eating turnip-tops, chickweed, &c., in sheltered fields, but I do not recollect ever seeing them migrate for frost alone, although they get distressingly thin in body and rough in plumage during a continued frost.—*G. B. Corbin.*

Starling's Nest under Ground.—I went to see the nest of a starling, containing four nearly-fledged young, which was about eighteen or twenty inches under ground, amongst stones, cinders and other rough materials, laid upon a drain round the foundation of the church, level with the ground, and covered with grass; there is but a small hole, like a rat-hole, perpendicular to the nest, but the passage turns round a stone, which I had to remove before I could satisfy myself that they were not there by accident,

as there is a colony of them above in the belfry. They were discovered by the noise they made while being fed.—*John Selater*.

Starling's Mode of Feeding.—I witnessed a few days ago a habit of the starling previously unknown to me. I was watching from a window a pair searching the newly-mown lawn, when I observed them pricking the ground, or rather grass-roots, with their mouths wide open, the mandibles being thus thrust in wide apart; this was continued until an insect was found, which was immediately swallowed.—*Id.*

Note on the Cuckoo and Pied Wagtail.—The following relation has been given to me by my friend Mr. Edward Fountaine, of Easton, Norfolk, and is I think worthy of a place in the pages of the 'Zoologist.' Mr. Fountaine has a small garden adjoining his residence, which is bounded on the side next the public road by an old ivy-clad wall. For eight or nine years, ending in 1871, a pair of pied wagtails nested twice every year in this ivy, with the exception of one year, when they built their nest under the tiles of an adjacent wood-shed. In each of these years the wagtails safely reared their first brood, after which they annually constructed a second nest, in which, *in every one of the above years*, a cuckoo laid its egg, which was duly hatched and the young cuckoo successfully reared by the wagtails, except on one occasion when their foster-child was killed by falling out of the nest. Although the note of the cuckoo was frequently heard in the immediate vicinity, after the young cuckoo was hatched, the parent cuckoo was never observed in any way to take any notice of its offspring. In 1872 the wagtails did not build their first nest as usual in the ivy, but in a large block of wood in which flowers were grown in another part of the garden: this nest was accidentally destroyed, probably by a rat, after which the wagtails forsook the garden, and did not appear there again that season. The cuckoo was seen several times in the garden early in the morning during the month of June, 1872; but whether the wagtails made a second nest elsewhere in that year, and if so whether the cuckoo succeeded in finding it, Mr. Fountaine is unable to say. During the spring of the present year the wagtails again nested in the ivy, and there successfully reared their first brood, since which they have constructed a second nest in another part of the garden, which now (June 12th) contains four of their own eggs, but none of the cuckoo's.—*J. H. Gurney; June, 1873.*

The Cuckoo.—How can it be ascertained with certainty whether the same hen cuckoo always lays eggs of the same colour, or whether (admitting this to be the case) she invariably lays in the nest of the same species—that is, in the nest of that species whose eggs most nearly approximate in colour to her own? And yet we must be satisfied on these points if we are to accept the ingenious theory of Dr. Baldamus. If we understand the learned German rightly, he states that, with a view to insure the preservation of species which would otherwise be exposed to danger, Nature has endowed

every hen cuckoo with the faculty of laying eggs similar in colour to those of the species in whose nest she lays, in order that they may be less easily detected by the foster-parents, and that she only makes use of the nest of some other species (*i. e.* of one whose eggs do *not* resemble her own) when, at the time she is ready to lay, a nest of the former description is not at hand. This statement, which concludes a long and interesting article on the subject in the German ornithological journal 'Naumannia,' for 1853, has deservedly attracted much attention. English readers were presented with an epitome of this article by Mr. Dawson Rowley in the 'Ibis' for 1865, and the Rev. A. C. Smith, after bringing it to the notice of the Wiltshire Archæological Society in the same year, published a literal translation of the paper in the 'Zoologist' for 1868. More recently, an excellent article on the subject, by Professor Newton, has appeared in 'Nature' (18th Nov., 1869).* To enter fully upon the details of this interesting subject would require more space than we have at our disposal; we can only glance, therefore, at the general opinions which have been expressed in connection with it. If the theory of Dr. Baldamus be correct, is it possible to give a reasonable and satisfactory explanation of it? This question has been answered by Professor Newton in the article to which we have just referred. He says:—"Without attributing any wonderful sagacity to the cuckoo, it does seem likely that the bird which once successfully deposited her eggs in a reed wren's or a titlark's nest should again seek for another reed wren's or a titlark's nest (as the case may be) when she had an egg to dispose of, and that she should continue her practice from one season to another. We know that year after year the same migratory bird will return to the same locality, and build its nest in almost the same spot. Though the cuckoo be somewhat of a vagrant, there is no improbability of her being subject to thus much regularity of habit, and indeed such has been asserted as an observed fact. If, then, this be so, there is every probability of her offspring inheriting the same habit, and the daughter of a cuckoo which always placed her egg in a reed wren's or a titlark's nest doing the like." In other words, the habit of depositing an egg in the nest of a particular species of bird is likely to become hereditary. This would be an excellent argument in support of the theory, were it not for one expression, upon which the whole value of the argument seems to us to depend. What is meant by the expression "once successfully deposited"? Does the cuckoo ever revisit a nest in which she has placed an egg, and satisfy herself that her offspring is hatched and cared for? If not (and we believe such an event is not usual, if indeed it has ever been known to occur), then nothing has been gained by the selection of a reed wren's or titlark's nest (as the case may be), and the cuckoo can have no reason for continuing the practice of using the same kind of nest from one season to another. While admitting,

* Reprinted in the 'Zoologist' (S. S. 3505).

therefore, the tendency which certain habits have to become hereditary in certain animals, we feel compelled to reject the application of this principle in the case of the cuckoo, on the ground that it can only hold good where the habit results in an advantage to the species, and in the present instance we have no proof either that there is an advantage, or, if there is, that the cuckoo is sensible of it. Touching the question of similarity between eggs laid by the same bird, Professor Newton says:—"I am in a position to maintain positively that there is a family likeness between the eggs laid by the same bird" (not a cuckoo) "even at an interval of many years," and he instances cases of certain golden eagles which came under his own observation. But do we not as frequently meet with instances in which eggs laid by the same bird are totally different in appearance? Take the case of a bird which lays four or five eggs in its own nest before it commences to sit upon them—for example, the sparrowhawk, blackbird, missel thrush, carrion crow, stone curlew, or blackheaded gull. Who has not found nests of any or all of these in which one egg, and sometimes more, differed entirely from the rest? And yet in each instance these were laid, as we may presume, not only by the same hen, but by the same hen *under the same conditions*, which can be seldom, if ever, the case with a cuckoo. Looking to the many instances in which eggs laid by the same bird, in the same nest, and under the same circumstances, vary *inter se*, it is not reasonable to suppose that eggs of the same cuckoo deposited in different nests, under different circumstances, and, presumably, different conditions of the ovary, would resemble each other. On the contrary, there is reason to expect they would be dissimilar. Further, we can confirm the statement of Mr. Dawson Rowley, who says, "I have found two types of cuckoo's eggs, laid, as I am nearly sure, by the same bird." ('Ibis,' 1865, p. 183.) It is undeniable that strong impressions upon the sense of sight, affecting the parent during conception or in an early stage of pregnancy, may and do influence the formation of the embryo, and it has consequently been asserted that the sight of the eggs lying in the nest has such an influence on the hen cuckoo, that her egg, which is ready to be laid, assumes the colour and markings of those before her. This is not, however, supported by facts. For the egg of a cuckoo is frequently found with eggs which do not in the least resemble it (*e.g.*, those of the hedgessparrow); or with eggs which from the nature of the nest could not have been seen by the cuckoo (as in the case of the redstart, wren, or willow wren); or deposited in a nest before a single egg had been laid therein by the rightful owner. Again, two cuckoo's eggs of a different colour have been found in the same nest. If both were laid by one bird, we have a proof that the same cuckoo does not always lay eggs of the same colour; if laid by different birds, then the cuckoo is not so impressionable as has been supposed. What really takes place, we believe, is this:—The cuckoo lays

her egg upon the ground; the colour of the egg is variable according to the condition of the ovary, which depends upon the age of the bird, the nature of its food, and state of health at the time of oviposition. With her egg in her bill, the bird then seeks a nest wherein to place it. We are not unwilling to accept the suggestion that, being cognizant of colour, she prefers a nest which contains eggs similar to her own, in order that the latter may be less easily discovered by the foster-parents. At the same time, we so frequently find the egg in question amongst others which differ totally from it in colour, that we cannot think that the cuckoo is so particular in her choice as Dr. Baldamus would have us believe. — *J. E. Harting, in Hardwicke's 'Science-Gossip,' 1st May, 1870.* [Communicated by the author.]

Hybrid between the Common Pigeon and Turtle Dove.—When in Rome, two months ago, I had an opportunity of seeing in the University of that city, and in the possession of Dr. De Santis, Professor of Natural History there, several specimens of a hybrid between the common pigeon and the turtle dove, which I believe is the first instance of their breeding together. The male was a house pigeon and the female a turtle dove. The young bird partook more of the turtle dove than the male parent in appearance.—*John J. Dalgleish; Brankston Grange, Culross, N. B., June 4, 1873.*

British Heronries.—In addition to the heronries already mentioned in the 'Zoologist,' I am happy in being able to report three more. In Killerton Park, near Exeter, the seat of Sir Thomas Dyke Acland, on the summit of a hill crowned with very lofty beeches, there has been a well-preserved heronry from time immemorial; the number of nests seemed considerable when I last saw then (in 1867), but I did not count them. Another heronry, if not more than one, flourishes in the grounds of my friend Sir William Clayton, at Harleyford, near Marlow, Bucks. And in the grounds at Kelsey Manor, Beckenham, Kent (P. R. Hoare, Esq.), there are always one or two nests annually, built in very aged Scotch firs, which hang over the lake.—*Henry Burney; Wavendon Rectory, near Woburn, Bedfordshire, June 23, 1873.*

Whimbrel in the New Forest.—It may interest the readers of the 'Zoologist' to learn that the whimbrel is occasionally met with in the forest at other times than the "dead of winter." On the 14th of May, 1870, I stuffed a couple (male and female) which had been shot in the forest the previous day; and at the beginning of May of the present year I saw another which had been killed not far from Ringwood, and at the end of the month I was one evening walking across some boggy ground in the forest, in the hope of getting a view of a pair of hen harriers I had observed a short time previously, when a whimbrel rose out of some grass and heather almost at my feet. The species is, I believe, not rare during the winter months in some of the harbours of the Hampshire coast, but all the specimens

above named were some miles from the sea; and although I have no reason to suppose that a straggling pair remain to breed in the forest, yet I thought the occurrence of the bird at such a time and place was worthy of remark, since the whimbrel is usually considered a mere winter visitor with us. I am informed that a teal's nest, containing eight eggs, was seen in the forest this spring.—*G. B. Corbin; July, 1873.*

Waterhens nesting in Trees.—On the 12th of June I put a waterhen off her nest, which was constructed fully nine feet from the ground, in a whitethorn at Hempstead, in Norfolk. The gamekeeper there told me that he had seen another waterhen's nest this season about thirteen feet from the ground, in a spruce fir, and that some years since he found one in a spruce fir fully twenty feet from the ground. In each of these three cases the tree was situated near the edge of a large pond.—*J. H. Gurney; June, 1873.*

Wild Duck and Leech.—The following incident has just been related to me by my friend the Rev. H. M. Wilkinson:—A wild duck had been discovered in the river in an apparently dying state, and a closer inspection of the poor suffering bird revealed a strange state of affairs. The water was deeply tinged with blood for some distance, and the duck, which was about three-parts grown, having been caught, a leech was discovered fastened to the inside of its mouth or throat, into which situation it doubtless had penetrated whilst the duck was feeding, and the poor bird had fallen a victim to the puny blood-sucker.—*G. B. Corbin.*

Wild-fowl at Ringwood.—On the 15th of February a pair of shovelers were shot near the river. I did not see the female, but the male, which I weighed and measured, was a splendid bird and in most lovely plumage. This species is not at all a frequent one in this neighbourhood, even in severe winters: I have seen but four previously, so I am not at all acquainted with the bird; but I think the weight and measurement of the bird I recently saw are worth mentioning, as it seemed to me to be very small compared with a female I possess,—which I may state was sent by a friend from Ireland a few seasons ago,—and it certainly is less than any of the few I have previously seen. It measured, when held up by the beak, exactly seventeen inches in length, and weighed barely eighteen ounces. Perhaps some of the readers of the 'Zoologist,' whose knowledge of this species is more reliable and extended than my own, will kindly tell us if the bird was remarkable from its small size? Several specimens of the pintail duck have been shot, but were frightfully mutilated. As a rule, I believe wild-fowl have been abundant this season, but on account of the continued floods few comparatively were shot. I have seen some pochards and a few wigeon exposed for sale, but on the whole I do not think the gunners made much of a harvest. Strange to say, I have scarcely seen a siskin this winter, and the snow bunting, which I have seen on several occasions during snow in

previous winters, has been entirely absent, as far as I have been able to learn.—*G. B. Corbin.*

Shark and Pilot-fish.—Off San Domingo, Monday, May 5, 1873. Two sharks appeared on the scene. The first went at the hook ravenously, and at the first attempt was most ignominiously hauled in and cut to pieces, while the other, a much larger one, made a grab at his tail as he disappeared. I never saw a more determined brute. Three times was she hooked, and almost triced up; but before we could get a bowline round her fins to hoist her in, the hook drew, or she managed to wriggle herself free. However, a fourth time she came up, followed by five pilot-fish, the two which had at first accompanied the others having attached themselves to her company: her mouth was bleeding freely from where she had been wounded before, and yet she came at the hook with its same bit of pork as fiercely as ever. This time the hook held, and the bowline got well jammed behind the head, and in she came over the stern, and was taken forward on a grating into the ship's head. Here the cutting up commenced, and, as she was a tremendous size round for her length, many people suggested she had young inside her. I had always been sceptical of sharks going about with young inside, but this time the question was settled, for I saw ten young sharks, from a foot and a half to two feet long cut out of her. They were quite lively and ready to start off on their own hook. They were a dark gray colour above and white below, and had all parts perfect,—eyes, breathing-holes, &c.,—and snapped with their little jaws with as much vigour as their parent, but they had only very small attempts at teeth. In the stomach of the shark was found rather a curious medley of things—beef-bones, a jam-pot, marline-spike, lots of oakum, and oily rags used for cleaning guns. She had evidently been following us for a few days, but had not been noticed before, as we were going too fast through the water. In addition to the pilot-fish following her, the shark had two suckers attached, but they got scraped off in hauling her over the taffrail. I fancy she was between seven and eight feet long, and enormously heavy and big round from having so many young in her.—*C. F. Penny, R.N., in litt.*

Pilot-fish off Penzance.—Two pilot-fish were taken last night in the mackerel-nets here, about fifteen leagues off shore south-west from this place, and consequently in deep water. It is but very rarely that this fish is taken in the open sea,—they are usually captured in harbours,—and these are supposed to have followed some vessel home from the Mediterranean. The captors report that there were many vessels about at the time they were captured.—*Thomas Cornish; Penzance, June 28, 1873.*

Angel-fish at St. Leonards.—A fine specimen of the angel-fish (*Squatina angelus*, Yarrell, vol. ii. p. 407) has been taken here. The length from the tip of the nose to the tip of the tail was four feet five inches and a half, and

its greatest breadth two feet eight inches: it weighed fifty pounds. I have saved its jaws.—*J. S. Bowerbank*; 2, *East Ascent, St. Leonards-on-Sea*, July 18, 1873.

Octopus vulgaris at Penzance.—I yesterday obtained a living specimen of *Octopus vulgaris*, but unfortunately failed to keep it alive. It measured from the hinder end of the sac to the extreme end of the longest arm two feet eight inches and a half. The sac to the mouth was eleven inches and a half, and to the eye eight inches; across the sac measured a trifle over six inches in the widest part.—*Thomas Cornish*; May 28, 1873.

Large Lobster.—In the Guernsey market, on the 19th of July, there was a fine lobster, which had been caught in Coles Bay. Its length, from head to tail, measured twenty inches: its claws were five inches and a quarter in width; its weight twelve and a half English pounds. This is not so large as the one caught at Plymouth, and mentioned in the July number of the 'Zoologist' (S. S. 3618), but is still, I think, worth noticing.—*C. B. Carey*.

Scyllarus Arctus at St. Leonards.—I have a very fine specimen of *Scyllarus Arctus*, found on the rocks of our coast. I had it fresh from the sea, and preserved it myself; it is in fine condition, and is five inches long. It is not described in Bell's 'Crustacea' as a British species.—*J. S. Bowerbank*.

A Difficulty for Darwinists.—The current number of the 'Zoologist' commences with a paper by Mr. F. H. Balkwill, having the pretentious title, "A Difficulty for Darwinists," in which, like many others who do not fully understand the subject, he lays too much stress on the possibility of slight variations in an *infinite* number of directions. No doubt it is theoretically possible for an infinite number of variations to occur in living bodies, if they are within the influence of an infinite number of different forces, just as the result of a very large number of forces acting on a particle may cause it to take one of almost an infinite number of directions. But the forces acting on the living body are comparatively limited; and when—as in the cases of the thylacine and the dog, or of the wombat and the rodent, which are the author's stumbling-blocks—the forces which have been called to act on the marsupial and placental types of organism have been practically identical, they having had to undergo the struggle for existence under similar circumstances, it is not to be wondered at, but only to be expected, that similar organisms should be the result, especially as the two types to start with are not separated by any great interval. It is just as probable, external circumstances being similar, that the isolated marsupial ancestor should give rise to carnivorous, rodent, and herbivorous forms, as that they should be developed from a placental type.—'Nature,' July 24, 1873.

[I thought the marsupial and placental types *were* separated by a very great interval; but I shall be pleased to receive and publish Mr. Balkwill's reply to this objection.—*E. Newman*.]

Proceedings of the Entomological Society.

June 2, 1873.—Sir SIDNEY S. SAUNDERS, Vice-President, in the chair.

Donations to the Library.

The following donations were announced, and thanks voted to the donors:—‘Bulletin of the Buffalo Society of Natural Sciences,’ vol. i. no. 1; presented by the Society. ‘Bullettino della Società Entomologica Italiana,’ vol. v. trim. 1; by the Society. ‘The Journal of the Quekett Microscopical Club,’ nos. 20, 21 and 22; by the Club. ‘Fifth Annual Report on the Noxious, Beneficial and other Insects of the State of Missouri,’ by Charles V. Riley; by the Author. ‘Beiträge zur Kenntniss der Dipterenfauna Galiziens,’ von Dr. Max. Nowicki; by the Author. ‘Les Papillons Diurnes de Belgique, Manuel du jeune Lépidoptériste,’ par Louis Quaëdvlieg; by the Author. ‘West Kent Natural History, Microscopical and Photographic Society: the President’s Address; the Council and Auditors’ Reports for 1872; and a Lecture on the Aquarium and its Contents, delivered in the Crystal Palace,’ by J. Jenner Weir, Esq., President, at the Soirée, November 6, 1872; by the Society. ‘Note sur les Genus Peribleptus, *Sch.*, Paipalesomus, *Sch.*, et Paipalephorus, *Jekel*,’ par M. H. Jekel; by the Author. ‘The Zoologist’ and ‘Entomologist’ for June; by the Editor. ‘The Entomologist’s Monthly Magazine’ for June; by the Editors.

Exhibitions, &c.

Mr. Bond brought to the meeting some seeds of *Gleditschia Sinensis*, received from Japan, which were all destroyed by a species of *Bruchus*, of which he exhibited living specimens.

Mr. Müller exhibited a *Psyche* case sent by Mr. Rothney from Calcutta. It was composed of the spines of some tree arranged longitudinally, so that the points were all at the upper end.

Sir Sidney Saunders exhibited a series of living Hymenopterous larvæ and pupæ in briar-stems, lately received from Albania. These briars having been recently split, showed the occupants in their natural cells. Specimens of the perfect insects reared from the larvæ were also exhibited, consisting of the following:—*Trypoxylon figulus*, *Smith*; *Raphiglossa Eumenoides*, *Saunders*; *Psiliglossa* (*Stenoglossa*, *Sauss.*) *Odyneroides*, *Saund.*; *Odynerus lævipès*, *Shuck.*; *Prosopis rubicola*, *Saund.*; *Osmia tridentata*, *Duf. & Perris*; and *O. leucomelana*, *Kirb.*

Mr. Müller communicated the following notes on the discovery, by Dr. Emile Joly, of Toulouse, of a nymph which he announced to belong to a species of *Oligoneuria*:—

“Having for the last fifteen years endeavoured to find the unknown early conditions of *Oligoneuria Rhenana*, *Imhoff*, but so far without success, it is

a matter of no little consolation to me to be enabled, through the courtesy of my valued friend Dr. Emile Joly, to announce, on his behalf, to the Society, his important discovery of the first nymph known in the genus *Oligoneuria*, and belonging to the species named by him 'Garumnica.' For this purpose I translate here Dr. Joly's communication from the French MSS., agreeably to his desire. My friend writes, 'I have the honour of addressing to the Entomological Society of London two drawings, to my knowledge entirely unpublished, and representing (fig. A), the upper side,*

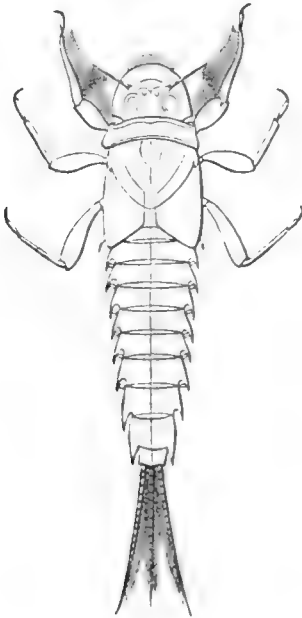


Fig. A.

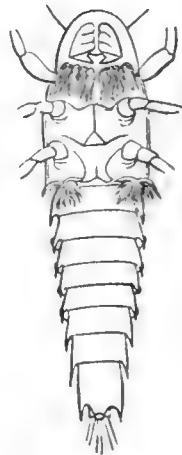


Fig. B.

(The above are three times the natural length.)

and (fig. B) the under side of the nymph of a new species of *Oligoneuria*, for which I have already proposed the specific name "*Garumnica*."† In 1869, on the very last excursion which I had the opportunity of making in

* This nymph, like the one of *Palingenia Roeselii* (*vide* Mém. de la Soc. des Sci. Nat. de Cherbourg, t. xvi.), with long ciliæ only on the internal border of the anterior legs, presents, like the last, above the thorax and in pairs overlying each other, four corneous sheaths intended to lodge the folded-back (*repliées*) wings of the insect up to the moment of its passing to the subimago state. It is therefore not, as Imhoff supposed, by a kind of division, by a spontaneous fissuring, that the four wings are formed, which are so easily recognised in the imago state of the insect, but rather that if sometimes there seem to exist only two wings, it is, as Hagen had at first deduced theoretically, because there exists a perfect attachment by simple agglutination of the posterior border of the fore wing to the anterior border of the hind wing.

† Emile Joly, 1870, "Contributions pour servir à l'Histoire Naturelle des Ephémérides," No. 1, in t. iv. du Bull. de la Soc. d'Hist. Nat. de Toulouse, avec Planche.

the bassin of the Garonne at Toulouse, I had the good luck of detecting the singular metamorphoses of this species. In all probability this nymph is the first and only one discovered in this genus up to the present time, as neither Pictet, the founder of the genus (*O. anomala*), nor Imhoff (*O. Rhenana*), nor Hagen (*O. Rhenana*, *var. pallida*), nor my friend Albert Müller in his different observations on the habits of *O. Rhenana*, nor M'Lachlan (*O. Trimeniana*), nor lastly, even the Rev. A. E. Eaton, in his fine and quite recently published monograph on the Ephemeriidæ,* mention anything concerning the larval stage (*l'état de ver*), or, as it is called in England, "the immature condition of the subaqueous stages of development," of any of the species, the names of which I have enumerated. I intend to publish shortly the complete anatomy of this curious nymph.'"

With regard to the above notes, Mr. M'Lachlan remarked that it would be most desirable to obtain further and more minute particulars respecting Dr. Joly's observations. The information furnished was very vague, and no characters were given of the supposed new species.

Mr. Wollaston communicated a paper "On the Genera of the Cossonidæ," including descriptions of 139 species which had not hitherto been recorded.

The Secretary read the following remarks, communicated to him in a letter from Mr. Roland Trimen, of Cape Town:—

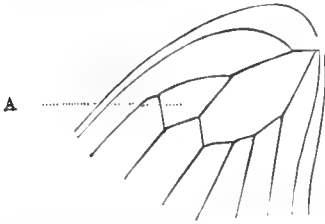
"I have lately read with much interest the Rev. R. P. Murray's notes 'On some Variations of Neuration observed in certain Papilionidæ,'† and desire to offer the following remarks thereon. In cases 1, 2, 3 and 4, Mr. Murray does not state whether the anastomosing or coalescing nervures are those of the fore or hind wings; but in the 1st and 2nd, it is clear, from the mention of *Synchloë* (*Pieris*) *Mesentina*, *Cramer*, that the fore wings are intended. In this Pieride, however, the junction of the first subcostal nervule with the costal nervule of the fore wings is not an aberration but a constant character of that species, as well as of *P. Severina*, *Cram.*, and a few allied species, and (as mentioned by me in *Trans. Ent. Soc.* 1870, p. 378) has been noticed by both Wallengren and Wallace.

"I am enabled to supplement case 5, '*P. Clodias*' (? *Parnassius Clodius*, *Mén.*), by a very similar and even more remarkable instance in a male *Papilio Merope*, *Cram.*, which has just recently come under my notice. As in Mr. Murray's description, the subcostal nervules of the hind wing in this specimen of *Merope* are connected by a transverse nervule; but the additional nervule (instead of being incomplete and confined to the right hind wing) is found in both hind wings and thoroughly unites the subcostal nervules. In this manner a perfect additional cell is formed (see A in figure)

* A. E. Eaton, "A Monograph on the Ephemeriidæ," in *Trans. Ent. Soc. Lond.*, 1871, with six plates.

† *Proc. Ent. Soc.*, 1872, pp. xxxiii.—xxxiv.

immediately adjoining and above the ordinary discoidal cell, and extending beyond it. The subcostal nervules are 'angulated and drawn together' by the transverse nervule, quite as Mr. Murray describes in *P. Clodius*, and



the additional cell is of the same size and shape in both hind wings. It is observable that the true discoidal cell is not at all distorted, but of the normal size and form in both hind wings. This interesting example of *P. Merope* was taken by Mr. J. H. Bowker on the Boolo River, a small tributary of the Tsomo, in Kaffraria Proper.

"I have in another place (*Trans. Linn. Soc.*, vol. xxvi. p. 501, note) commented on the remarkable neuration of the Papilionidæ, and pointed out how the presence of more than one cell enclosed by anastomosing nervures constitutes an indication of affinity to the Heterocerous groups of Lepidoptera; and this indication acquires additional significance in view of the interesting facts recorded by Mr. Murray respecting butterflies of this family, and of the circumstance of the tendency to form additional wing-cells finding such marked development in the specimen of *P. Merope* above described. There can, I think, be little doubt that (as Mr. Murray suggests in reference to the pre-discoidal cell discovered in some examples of *Thais Polixena*, *W. V.*) these exceptional cases of neuration are referable to reversion to ancestral characters, and point to a remote community of origin between the Papilionidæ and the higher Heterocera.

"In my discussion (*loc. cit.*, pp. 501–2) of this question of the position of the Papilionidæ, I overlooked Boisduval's account (*Faune Ent. de Madag.*, &c., pp. 6 and 113) of the larva of the splendid *Urania Rhipheus*, or I should not have quoted *Cerura* as affording the *only* other instance among the Lepidoptera of organs analogous to the Y-shaped tentacle of the Papilionide caterpillars. Boisduval states particularly (on the authority of Captain Sganzin, who reared a large number of the *Urania*) that the larva of *Rhipheus* possesses, 'comme dans les Papilio,' '*deux cornes rétractiles, roses, placées sur le premier anneau*,' adding that it exerts them at will ('*fait sortir à volonté*'). Mr. Wallace, not only in his paper on Malayan Papilionidæ (*Trans. Linn. Soc.*, vol. xxv.), but more recently in his valuable '*Contributions to the Theory of Natural Selection*,' 2nd edit. 1871, has laid such stress on the possession of the exsertible Y-shaped organ being, as the *exclusive* character of Papilionide larvæ, a sign of the highest development of the Lepidopterous Order, that the presence of an apparently identical organ in the undoubtedly Heterocerous *Urania* is a fact most worthy of special notice.

"PS.—I add a line to say that I have just heard (24th April) that proof of the species-identity of *Papilio Merope* and *Ps. Cenea*, *Hippocoon* and

Trophonius has been obtained by Mr. Mansel Weale, who has reared them all from larvæ found on *Vepris lanceolata*. I hope to give full particulars shortly."

New Part of 'Transactions.'

Part ii. of the 'Transactions' for 1873 was on the table.

July 7, 1873.—HENRY T. STANTON, Esq., F.R.S., &c., Vice-President, in the chair.♦

Additions to the Library.

The following donations were announced, and thanks voted to the donors :—
 'The Proceedings of the Royal Society,' No. 144; presented by the Society. 'Proceedings of the Scientific Meetings of the Zoological Society of London, 1872,' pt. 3; by the Society. 'Bulletin de la Société Impériale des Naturalistes de Moscou, 1872,' No. 4; by the Society. 'Annales de la Société Entomologique de France,' 4e Sér., tome x. (Partie Supplémentaire, Famille des Eucnémides 2e & 3e Cahiers), 5e Sér., tome ii.; by the Society. 'Illustrations of North-American Entomology (United States and Canada),' by Townend Glover, Washington, D.C.—Orthoptera; by the Author. 'De Skandinaviske og Arktiske Amphipoder beskrevne,' af Axel Boeck; by the Author. 'Exotic Butterflies,' part 87; by W. Wilson Saunders, Esq. 'Lepidoptera Exotica,' part xvii.; by E. W. Janson. 'Catalogue of the Specimens of Hemiptera Heteroptera in the Collection of the British Museum,' parts vi. and vii., by Francis Walker; by the Trustees of the British Museum. 'General List of the Spiders of Palestine and Syria, with Descriptions of numerous new Species and Characters of two new Genera;' 'Descriptions of Twenty-four new Species of Erigone;' by the Author, the Rev. O. P.—Cambridge, M.A., C.M.Z.S. 'The Butterflies and Moths of Canada, with Descriptions of their Colour, Size and Habits, and the Food and Metamorphosis of their Larvæ;' by the Author, Alexander Milton Ross, M.D., &c. 'La Teigne du Pommier;' by the Author, M. A. Guenée. 'Anteckningar til Lapplands Coleopter-Fauna,' af John Sahlberg; by the Author. 'Bidrag til Norges Insektfauna,' af H. Siebke; by the Author. 'Carcinologiske Bidrag til Norges Fauna: I. Monographi over de ved Norges Kyster forekomme de Mysider, Andit Hefte;' 'Diagnoser af nye Annelider fra Christianiafjorden, efter Professor M. Sars's efterladte Manuskripter;' 'Undersøgelser over Hardangerfjordens Fauna; I. Crustacea;' 'Bidrag til Kundskaben om Christianiafjordens Fauna: III. Vaesentlig udarbeidet efter Prof. Dr. M. Sars's efterladte Manuskripter;' by the Author, G. O. Sars. 'The Canadian Entomologist,' vol. v., nos. 4 and 5; by the Editor. 'The Entomologist's Monthly Magazine' for July; by the Editors.

'Newman's Entomologist' and 'The Zoologist' for July; by the Editor. 'On Nephropsis Stewarti, a new Genus and Species of Macrurous Crustaceans dredged in deep water off the eastern coast of the Andaman Islands; 'On new or little known Species of Phasmidæ,' part I. Genus Bacillus;' by the Author, James Wood Mason, Esq.

Exhibitions, &c.

Mr. Weir exhibited eight examples of *Agrotera nemoralis*, taken by him in June at Abbot's Wood, near Lewes. They were observed only in the thickest parts of the wood.

Prof. Westwood sent copies of two parts of his forthcoming 'Thesaurus Entomologicus Oxoniensis.'

Mr. Bond exhibited larvæ of the *Bruchus* from Japan brought to the last meeting. The species was apparently undescribed, and would be included in the paper on Japanese Curculionidæ, prepared (for the Belgian 'Annales') by M. Roelofs.

Mr. M'Lachlan exhibited a strongly-marked instance of gynandromorphism in a Dipterous insect (one of the Syrphidæ) taken by him at Black Park.

Mr. Müller exhibited a number of small galls found by Mr. Trovey Blackmore on the under side of a broad-leaved species of oak growing near Tangier: they were probably formed by a species of *Neuroterus*. Mr. Blackmore also exhibited some large galls found on the same species of oak, which had been taken possession of by an ant (*Crematogaster scutellaris*, Oliv.). Mr. Smith remarked that the common oak-apple in this country was sometimes taken possession of, in a similar manner, by a species of *Osmia*.

Mr. W. B. Pryer exhibited a selection from his captures of *Lepidoptera* from China.

Papers read, &c.

Sir Sidney Saunders communicated a paper, "On the Habits and Economy of certain Hymenopterous Insects which nidificate in Briars, and their Parasites." The insects were exhibited at the last meeting, and Sir Sidney further exhibited a specimen of a *Raphiglossa*, in illustration of the remarkable position of the insect during repose. It was attached by its mandibles to a thorn, from which it extended horizontally, without any further support, the legs being uppermost. Mr. F. Smith reminded the meeting that an analogous habit had been recorded concerning *Chelostoma florissomne*, and the individuals observed were invariably males.

Mr. Butler communicated a paper on the species of *Galeodides*, with description of a new species in the British Museum.—*F. G.*

Notices of New Books.

Official Handbook to the Marine Aquarium of the Crystal Palace Aquarium Company (Limited). By W. A. LLOYD, Superintendent of the Aquarium. Fifth Edition, revised and enlarged. 1873.

THE AQUARIUM is an Institution, a great institution, and in its present form a novel institution; but I venture to believe a lasting institution: it has passed through two eras, and has entered on a third; the first, which endured for a decade, say from 1830 to 1840, was very humble, very instructive—almost wholly utilitarian; the second, which endured for two decades, say from 1840 to 1860, was literary, poetic and fashionable; and the third, upon which we have boldly and vigorously entered, may be styled commercial and ambitious: the first was the humble handmaid of Science; the second the servant of fashion; and the third the child of speculation. I need scarcely say the first decade had my entire and zealous sympathy; the second my amused attention; and the third my boundless admiration of the results obtained, without exciting much interest in its progress as a commercial venture.

Three pitfalls—shall I call them crotchets?—have beset the path of the aquarian author: *first*, the idea of planting the aquarium as a marine lettuce garden; *secondly*, the idea of making it the theme of a lecture on taste; and *thirdly*, the idea of dictating the mode in which the prisoners shall breathe. Mr. Lloyd has not merely avoided the first of these, but has taught others to avoid it, and to allow Nature to be her own gardener; into the second and third, like Quintius Curtius, he has leaped headlong, generously sacrificing himself for the benefit of Science, or what he conscientiously believes to be Science. I will bestow a few lines on each of these crotchets, or ideas, or pitfalls, call them which you will.

i. *The Gardening Crotchet.*—We all know that botanists divide sea-weeds into three series, the olive, the red, and the green, and our three most esteemed authors on aquariums, Gosse, Rymer Jones, and Warrington, have thought it desirable to plant the aquarium with one or other of these series: these eminent naturalists seem equally unaware that you cannot transplant a sea-weed

from the ocean into your parlour; much less can you select a peculiar colour: Nature will plant all the sea-weeds she requires, and will brook no advice or assistance from man. I have often smiled at the instructions given under this head, and have wondered whether the authors have discovered and avowed their error. Let us hear Mr. Gosse, who has been followed in a like strain by every dabbler in aquarian literature. I quote from 'The Aquarium,' p. 21.

"The first point to be attended to is the procuring of living sea-weeds, the vegetable element in the combination which is displayed in the Aquarium. And this must be the first thing, whether we are stocking a permanent tank, or merely collecting specimens for temporary examination, as we cannot preserve the animals in health for a single day except by the help of plants to re-oxygenate the exhausted water. By their means, however, nothing is easier than to have an Aquarium on almost as small a scale as we please; and every visitor to the sea-side, though there for ever so brief a stay, may enjoy, with the least possible trouble, the amenities of zoological study in a soup-plate, or even in a tumbler. * * * * Suppose the time to be the first or second day after full or new moon, when the tide recedes to its greatest extent, laying bare large tracts of surface that are ordinarily covered by the sea. This is the most suitable time for procuring sea weeds, for these must be taken in a growing state; and hence the specimens that are washed on shore, and which serve very well for laying out on paper, are utterly useless for our purpose. With a large, covered, collecting-basket, a couple of wide-mouthed stone jars, a similar one of glass, two or three smaller phials, a couple of strong hammers, and the same number of what are technically termed cold chisels, tipped with steel, I proceed with an attendant to some one of the ledges of black rock that project like long slender tongues into the sea. An unpractised foot would find the walking precarious and dangerous, for the rocks are rough and sharp, and the dense matting of black bladder-weed with which they are covered conceals many abrupt and deep clefts beneath its slimy drapery. These fissures, however, are valuable to us. We lift up the hanging mass of olive weed from the edge, and find the sides of the clefts often fringed with the most delicate and lovely forms of sea-weed; such, for example, as the winged *Delesseria*, which grows in thin, much-cut leaves of the richest crimson hue, and the feathery *Ptilota* of a duller red. Beneath the shadow of the coarser weeds delights also to grow the *Chondrus* in the form of little leafy bushes, each leaf widening to a flattened top. When viewed growing in its native element this plant is particularly beautiful, for its numerous leaves glow with refulgent reflections of azure resembling the colour of tempered steel. * * * * High wading boots are necessary

for this purpose. * * * * The most valuable plant of all for our purpose is the sea-lettuce.”—‘*The Aquarium*,’ pp. 21 to 28 inclusive.

We must eliminate all this advice and much more which will be found throughout Chapter II. of ‘*The Aquarium*’; we must make a bundle of the collecting-basket, the two strong hammers, the two cold chisels, the two wide-mouthed stone jars, the one glass ditto, and all the paraphernalia of sea-weed collecting, and all aquarium books and aquarium advice, and all aquarium poetry and romance, if we would utilize the aquarium and make it a source of improvement and instruction.

ii. *The Lecture on Taste*.—Mr. Lloyd has, I think, gone rather out of his way in his lecture on taste: we have become familiar with Mr. Ruskin’s idea of imitation; he condemns everything that is not real, not *bonâ fide*; a mantelpiece painted to imitate marble is one of his familiar examples; and thus Mr. Lloyd condemns the introduction of imitation cromlechs, imitation grottoes and imitation arches beneath the surface of the water. This section of aquarian literature admits great latitude of opinion, and I am quite willing to allow ornamentation to take its course; all attempts to restrain or direct it must seem rather pragmatistical to those who think differently, and will certainly be unavailing.

iii. *The Crotchet on Lung-breathing*.—My friend introduces a broad distinction between animals that breathe in the sea by means of lungs and by means of gills; and would forbid us to keep porpoises, because their respiratory organs differ from those of sharks. No such restriction as this is rational: a porpoise or dolphin is as legitimate an object for the aquarium as a dog-fish or a skate; I would even introduce a spermaceti whale, did not his magnitude and muscular powers suggest certain difficulties both to his transit and to his captivity. I hope Mr. Lloyd will abandon this crotchet, and will exhibit a school of porpoises careering in his tank as soon as the Company can afford one sufficiently capacious.

Eliminating these three crotchets: the *transplanting*, because false in principle and impossible in practice; *taste*, because its laws are not to be defined and dismissed in this offhand manner; and the rejection of *lung-breathers*, because their presence would greatly enhance the interest of an aquarium, and because Nature, who knows so much better than ourselves, admits them in abundance, associating lung-breathers and gill-breathers, making them mutually dependent, and we *must not expect to improvize a better form of*

government than her own: it appears to me a very grave if not a fatal mistake to reject the teachings of Nature and substitute others in their stead. It cannot fail to strike the thoughtful mind that this mixing up of creatures differently constituted, differently organized, is the only method by which each will be constantly provided with the food and conditions adapted for the well-being of itself and the continuance of its kind. If you would confine tenants of the sea, make their cage as like the sea as possible; if you would keep the tenants of a river, make your prison-house a miniature river. Take a lesson from the gardener: associate phanerogams and cryptogams, the orchid and the passion-flower, with the fern and the Lycopodium: Nature does this, and the gardener copies her and succeeds to perfection.

ERA I. UTILITARIAN.

The birth of the aquarium is of such remote antiquity that we fail to ascertain the date with any certainty. The point at which any vessel containing water and fishes becomes an aquarium is equally open to discussion. There is abundant reason to suppose that the Chinese and the Japanese had their fresh-water aquariums thousands of years before the Christian era; the Romans certainly had theirs; but in neither of these instances is there any evidence of their being considered, as now, a noteworthy institution; by the Romans they were established for economic purposes and nothing more. I do not know whether such vessels are again mentioned until 1665, when Mr. Pepys in his Diary, under date 28 May, 1665, as cited by Mr. Lloyd, observes, "Thence to see my Lady Pen, where my wife and I were shown a fine rarity; of fishes kept in a glass of water, that will live for ever—and finely marked they are, being foreign." I consider this brief passage of infinite interest; were I in a severely critical mood I might object to the expression "live for ever," because I doubt whether any created being enjoys perpetuity of existence; but waiving this objection, I think the passage establishes the fact that fishes were kept in confinement at Lady Pen's in 1665; and that Mr. Pepys was informed that they had this extraordinary vitality. It is rather a notable fact that we know of no instances of fishes dying or being deteriorated by age: we never hear complaints of a sole, or a turbot, or a salmon, being old and hence objectionable: this can scarcely be asserted of our taurine or anserine, or even gallinaceous, food.

Coming down to later times, we find that in 1743 our countryman Baker distinctly represented specimens of *Hydra viridis* kept in water in an upright glass vessel.

It appears from the works of Esper, published continuously from 1771 to 1784, that that distinguished entomologist constantly kept aquatic insects in water: he has given us most interesting particulars concerning them, and seems to have been delighted in observing their longevity in confinement; he particularly mentions a male individual of *Dytiscus marginalis*, a carnivorous water beetle, that lived three years and six months in his aquarium; and James Francis Stephens many years subsequently, commenting on this seemingly extraordinary fact, attributes this prolonged life to enforced celibacy. Esper has left no record, so far as I am aware, of the plan or principle of his aquarium, and I believe only this single record of his success.

Simultaneously with Esper, Gilbert White seems to have utilized the aquarium for observation: the first edition of his 'Natural History of Selborne,' printed in 1789, but written in 1781, has the following passage:—"When I happen to visit a family where gold and silver fishes are kept in a glass bowl, I am always pleased with the occurrence, because it offers me an opportunity of observing the actions and propensities of those beings with whose lives we can be little acquainted in their natural state. Not long since I spent a fortnight at the house of a friend, where there was such a *vivary*, to which I paid no small attention, taking every care to remark what passed within its narrow limits." This great naturalist, for great he really was in his singular acuteness of observation and scrupulous truthfulness of narration, thus utilized an aquarium, although calling it by another name: his observations on the manner of death in fishes, on the structure of their eyes, and on their mode of progression, the pectorals being employed for gentle motion, and the caudal for "shooting along with inconceivable rapidity," show to what good purpose he devoted these opportunities of observing.

I have met with no evidence of experiments or arrangements of the same kind until, in 1830, my esteemed and respected friend James Scott Bowerbank, then residing at No. 19, Critchell-place, New North-road, continuously and successfully utilized the aquarium in his researches into the "Circulation of the Blood in Insects." Of all investigators I ever knew, Dr. Bowerbank was the

most enthusiastic, the most persevering, the most successful, and the most willing to impart his discoveries to others. I have always considered my introduction to Dr. Bowerbank one of the most fortunate events of my life, and the hours that I have spent under his tuition as the most delightful and most worthy of remembrance. Let us see what Dr. Bowerbank did with his aquarium. Cuvier's 'Règne Animal' was published in 1824, and contains the following paragraph:—

“Dans les animaux qui n'ont pas de circulation, notamment dans les insectes, le fluide nourricier baigne toutes les parties; chacune d'elles y puise les molécules nécessaires à son entretien; s'il faut que quelque liquide soit produit, des vaisseaux propres flottent dans le fluide nourricier, et y pompent, par leur pores, les éléments nécessaires à la composition de ce liquide.”—‘*Règne Animal*,’ vol. i. p. 37.

The English translation renders the passage thus:—

“In animals that have no circulation, in insects particularly, the parts are all bathed in the nutritive fluid; each of these parts draws from it what it requires, and if the production of a liquid be necessary, proper vessels floating in the fluid take up by their pores the constituent elements of that fluid.”—‘*Animal Kingdom*,’ vol. i. p. 18.

No sooner had I read this than I expressed my dissent from such a doctrine; I felt certain that insects possessed a circulation. Whether influenced by a desire to bring Cuvier's dictum to the *experimentum crucis*, or from a simple and characteristic thirst for truth, Mr. Bowerbank went into the question heart and soul. Throughout the years 1831 and 1832 he worked hard at the important question whether or no insects possess a circulation: to this end he sallied forth on larva-hunting expeditions with the late Mr. Tully, the celebrated optician, with one of whose excellent instruments his microscopic researches were conducted. “He [Mr. Tully] told me,” says Mr. Bowerbank, “all about these larvæ, and where to obtain them, and that they must be kept in the water to which they were accustomed; so we always adhered to that plan, for we found that if we brought them home in a very little water, and added a considerable quantity from the house-cistern, the water thus added generally killed nearly all of them; so I employed a man to take an earthen jar that would hold at least a gallon of the very water in which the larvæ were found; this I poured into the glass prepared for it, putting in a little *Conferva*

and a few water-snails, *Limnea peregra*, and the smaller species of *Planorbis*, in the water, and floating a little duck-weed on the surface: then the glass was placed in the sun, so as to assimilate the condition of the little captives as nearly as possible to what it had been when in the ponds on Hampstead Heath in which they had been hatched, and in which they were found. Treated thus they continued alive and well, *without change of water, and thus I was enabled to continue the observations for nearly two years.*"

Although in this passage the words "aquarium," "balance of life," and "compensating principle" do not occur, it is very evident that Mr. Bowerbank was aware of the use of vegetation in maintaining life-supporting properties in stagnant water, and the necessity also of imitating the natural conditions of the animals he desired to keep therein. To this hour none of us have advanced further with fresh water, and success only results from keeping these objects steadily in view. Mr. Bowerbank's paper was finished on the 1st of October, 1832, and was published at p. 239 of the 'Entomological Magazine' for April, 1833. I need scarcely say that it placed the author at once at the head of all observers in this branch of Entomological Science. I regard it as the best, if not the first instance of thoroughly utilizing the compensation principle of the fresh-water aquarium: plants to evolve oxygen, animals to consume it.

In the same year Professor Daubeny read, at the Cambridge meeting of the British Association for the Advancement of Science, a paper communicating the result of researches he was then making on the subject of confining animals and plants together in water, in the course of which he established beyond dispute that it was the illuminating and not the heating powers of the sun's rays which caused the evolution of oxygen from plants. He then went on to say that the plants not only evolved oxygen but assimilated carbon from the poisonous carbonic-acid gas which results from the respiration of animals, decomposing it and rendering it harmless. Finally, he asserted boldly "*that the influence of the vegetable might serve as a complete compensation for that of the animal kingdom.*" Thus he seems by inductive reasoning and possibly by seeing the successful results in many parlours in London, to have perceived as clearly, as he expressed happily, the theory and practice of the aquarium; but it must be recorded that while everyone else was succeeding to admiration, Dr. Daubeny

utterly failed in reducing his theory to practice, and his establishment for exhibiting the compensatory process was totally unsuccessful.

Imitation is the inevitable tribute, the sweet-smelling incense, offered on the altar of obvious success. I will not presume to express a doubt of the originality of many of those who set up aquariums between 1830 and 1840, but I think that most of us were incited to the act by Mr. Bowerbank's successful example; Goring and Pritchard admit the fact; they even quote Mr. Bowerbank as the authority for their doings. I was a similar imitator of my friend: after seeing his captives, and watching the unspeakable grace and beauty of their movements, I caught at once at this new field of observation. In January, 1832, I commenced operations with a water-net made of cheese-cloth: the Woolwich Marshes and Wandsworth Common were the scenes of my exploits, and a large white basin my first aquarium: some of the results were published at p. 315 of the first volume of the 'Entomological Magazine' in 1833, simultaneously with Mr. Bowerbank's; I made my appearance as an aquarian, as I may truly say, hanging on by the skirts of my leader's coat. I soon became absorbed in the denizens of the white basin, and they were as speedily transferred to a more convenient receptacle, an upright glass jar, where they lived in health for a very considerable time, but the only observation published in 1833 was that "the carnivorous water-beetles, *Dytiscus*, *Colymbetes*, *Acilius*, *Hydroporus*, &c., in swimming moved their hind legs simultaneously, striking out with great vigour in the same way as a frog; whereas the herbivorous water-beetles, *Hydrous*, *Hydrophilus*, &c., moved *their* hind legs alternately, thus making weaker strokes and progressing in the water much more slowly." Professor Westwood, at pp. 97 and 123 of the first volume of his 'Modern Classification,' did me the honour to copy, endorse and adopt my observations. I might here introduce a multitude of jottings on the manners and customs of water-beetles in confinement, but I forbear.

In the years 1836, 1837 and 1838 my friend Mr. Edwards, a most accurate and painstaking observer, then residing at 17, High-street, Shoreditch, by means of his aquarium, made himself thoroughly acquainted with one of the most deeply interesting and unexpected facts ever discovered in the entire range of Natural History—I allude to the nidification of sticklebacks. It was not until fourteen

years afterwards that Mr. Warington, going over the same ground, observed the same facts, and recorded in the 'Zoologist' (Zool. 3635) the wonderful results. In the course of his communication Mr. Warington incidentally observes, "Mr. Edwards, of Shoreditch, whose London garden-pond has afforded much interesting matter to many microscopists, informs me, in a note dated August 27, 1852, that it is fourteen years since he first noticed the fact of the stickle-back building a nest, guarding and defending the young ones." Mr. Gratton, Mr. Bowerbank, and I, as well as microscopists out of number, were in the habit of visiting Mr. Edwards, and took great interest in his aquarian researches.

I should, however, here record that Mr. Edwards's first aquarium was, as Mr. Warington has described it, a "London garden-pond"; in fact, it was a stuccoed basin through which a small stream of New River water was constantly flowing. This plan, perfectly successful as regards the health and vigour of his captives, was soon supplemented by the glass jar, so much more convenient for patient, continuous and accurate investigation. Mr. Edwards was a watch-maker, and his sticklebacks were kept in a delightful little parlour behind the shop. It was not until some years later that Mr. Gratton set up a similar stickleback observatory at 87, Shoreditch; and the late respected Matthew Marshall another, at his official residence in the Bank of England, so that I enjoyed abundant opportunities of watching the proceedings of these "wonderful fishes."

I mention Mr. Edwards as the first scientific man who observed the nesting of sticklebacks. I say "scientific," because I am aware that from time immemorial the boys hunting "stitlers," and bringing them home in a quadrate pickle-bottle suspended from a stick, were perfectly cognizant of a fact which seemed to have been unknown to naturalists: from them I had learned, long, long before, that there were "cock stitlers" and "hen stitlers," and that the former were also called "redbreasts," and were famous for their fighting propensities: often as I watched the exhibition of these propensities in the aquariums of Mr. Edwards, Mr. Gratton and Mr. Marshall, and often as my fingers itched to write an account of them, I always forbore, for the discovery was the property of these gentlemen, and not mine; and to them, and not to me, of right belonged the honour and glory that must result from making the revelation. Alas! these excellent men have passed away, and

have left no record of their doings except in the memories of their survivors.

Our stickleback doings at that early period not only engrossed the attention of the little company of aquarians who met at Mr. Bowerbank's hospitable mansion on a Monday evening, but attracted the notice of an outside public, to which they were the never-failing source of pleasantry: very refreshing was that incessant fusillade of small jokes to those who fired them, and very harmless to those who received them. Even the "inimitable" author of the 'Pickwick Papers,' whom nothing amusing, or ludicrous, or note-worthy, or instructive, ever escaped, took the tide of this little mania on the flood, and rendered Hampstead Heath and its ponds and its sticklebacks immortal in his pages. Mr. Pickwick is described as the author of a paper intituled "Speculations on the Source of Hampstead Ponds, with some Observations on the Theory of Tittlebats," and the Club of which he was the enlightened President sent forth that eminent man to make further researches. The author adds, "There sat the man who had traced to their source the mighty ponds of Hampstead, and agitated the world with his Theory of Tittlebats, as calm and unmoved as the deep waters of the one on a frosty day or a solitary specimen of the other in the inmost recesses of an earthen jar." This shows that the new fancy had taken so deep a hold on the public mind that it was worthy of good-humoured banter by a man who never fought with shadows.

It was not until the year 1842 that the nest-building talents of the stickleback were fully revealed to the world, and then it was another species of stickleback, *Gasterosteus spinachia*, through another medium of observation (the open sea), and another hand (that of R. Q. Couch) that held the pen (Zool. 796). Mr. Couch, like his predecessors, has passed away, but unlike them has left a trace of his handywork which will endure as long as Ichthyology is a science.

Again, Mr. Kinahan, addressing the Dublin Natural History Society, years afterwards, observes of *Gasterosteus leiurus*, "Concerning the manner in which this little fish preserves its spawn not the slightest notice, if I may judge from the silence of our latest authorities, has been taken by any naturalist." Alas! that it should have been so; yet numbers of us, I can positively assert, were as intimately acquainted with the facts which Mr. Kinahan recorded (Zool. 3526) as he could possibly have been.

In 1851 Mr. Warington repeated these observations (Zool. 3636), and thus accomplished a task which Mr. Edwards was fully competent to have undertaken and completed twenty years previously. All honour to them both: these gentlemen, like Mr. Couch and Mr. Kinahan, and subsequently M. Conte of Paris, have given us abundant evidence that they observed accurately the facts which they have recorded so graphically. I trust that no confusion of dates will arise from my coupling the observations of 1838 with the records of 1851. It is really difficult to do otherwise, for a succession of observations were being carried on during the whole of the intervening period, although no contemporary record appears to have been made.

No one who has not witnessed, I may say who has not gloated over, the procreative and educational proceedings of the stickle-backs, can form any conception of their absorbing interest: no one who has not seen the "redbreast" in all his glory and pride of place, can possibly picture to himself the exceeding beauty of this little fish: it only endures while the cares of paternity are upon him: then, and then only, I might address to him the lines of Lord Byron's dedication of Childe Harold to Ianthe:—

" Shall I vainly seek
To paint those charms which varied as they beamed?
To such as see thee not my words were weak,
To those who gaze on thee what language could they speak?

* * * * *
Oh, let that eye which, wild as the gazelle's,
Now brightly bold, now beautifully shy,
Wins as it wanders, dazzles where it dwells."

It may be a strange conceit to transfer this picture to a fish, and to a male rather than a female, but it is appropriate; the female is a nonentity, a being without attraction; a provision for the continuance of her kind, and nothing more; she fulfils her destination without love, without sentiment, without sensation, a perfect apathet: but with the male it is not so; *his* eye is more resplendent than the throat of a humming bird, and like that beautiful object varies with every change of position; it is now a burning sapphire, now a living emerald; his breast and belly are brilliant crimson thrown up by contrast with the delicate translucent green of his back; his entire body seems diaphanous, his eye alone retaining its solidity; the rest is glowing, aye, melting, with internal incandescence. Strange, but sad, this male Ianthe is possessed by a

demon! Can he be jealous of his inornate mate? jealous of the advent of other *Ianthes*? Yes, but he is only jealous of their meddling with his nursery: the loves of the fishes are wonderful, and man's sagacity cannot understand them.

But I am putting the cart before the horse: I have prepared a receptacle for this *Ianthe*, a lozenge-glass eight inches in diameter and twelve inches in height; two inches of loam cover the bottom, and perhaps an inch of very clean and very fine gravel covers the loam; a plant of *Valisneria spiralis* is rooted in the loam, and sends up its sword-like leaves and its corkscrew-like petioles to the surface of the water, each producing a single flower destined to float in company with innumerable green circular disks of duck-weed, and a dozen leaves of frog's-bit, each doing its best to take firm hold of the water with its roots; those of the duck-weed are simple threads; those of the frog's-bit generally tend downwards in an oblique direction, and are thickly fringed throughout with lateral fibres, making them look like minute bottle-brushes of rather unusual proportions; imagine small water-beetles treading the water in an orderly and business-like manner, and now and then rising to the surface like pigmy water-balloons, each with a bubble of air annexed to his posterior extremity: he is the manufacturer of his own gas: imagine half-a-dozen other water-beetles crawling deliberately, belly upwards, among the duck-weed, and add a few smaller living creatures floating, or walking, or darting in the water just as fancy or instinct guides them, and you will have a tolerably correct notion of the sort of aquarium in general use amongst us Bowerbankians, and into the depths of which we gazed with boundless and unwearying satisfaction. Next witness the arrival of a quadrate pickle-bottle, with a wet string twisted three or four times round its neck and once or twice across its wide mouth, this transverse portion of string serving as a handle by which to carry it: the boy who brings this recommends the contents as being "prime stitlers, all cocks." We take his word, and carefully pouring off the superfluous water, empty the living contents of the pickle-bottle into our aquarium.

Success is neither certain nor immediate: my feelings at Deptford, where all my manual acquaintance with the aquarium was gained, have many times been cut to the quick by finding the sticklebacks chevying one another for days and nights round and round the lozenge-glass, until they died apparently from sheer exhaustion;

at first the amount of vital energy was excessive, far too great, but it was the old story, the sword wore out the scabbard; more frequently complete success was the result. We will suppose a dozen of these little fishes turned into the upright aquarium I have described; an hour will scarcely elapse before one of the fiery redbreasts asserts himself master, selects a part of the establishment "for building purposes" and drives off all intruders: if a second redbreast should call his supremacy in question and contest the point, he must be removed at the risk of disarranging the establishment, but this disarrangement is of less importance than it appears: after stirring up the contents of the glass in a most violent manner in your determination to eject an objectionable tenant of any kind, they will settle down in half an hour and arrange themselves as prettily and as naturally as before you converted their dwelling-place into a miniature Maelstrom. Leaving one redbreast master of the situation, he immediately commences building operations, but at first these operations do not seem to be conducted on any definite plan; and you begin to think the work is aimless and objectless: half a dozen nests will be begun and deserted; the structure is then pulled to pieces and the materials are carried elsewhere: what are these materials? little gravel-stones, roots of water-plants, hair-like *Confervæ* spontaneously generated out of nothing, decaying leaves of *Valisneria*, and all manner of fragments, which we should characterize as rubbish: by-and-bye an event occurs, unseen and unnoticed, which concentrates all the attentions of the redbreast to one spot: this event is the deposition of spawn by a gravid female; I could never witness the operation, but have no doubt whatever that this event is the governing cause of future proceedings: a foundation, a circular wall or rim, is then constructed around the precious deposit, and this is increased, and improved, and consolidated, in the most wonderful manner, the builder being incessant in his labours; sometimes he will bite off a root of the duck-weed or frog's-bit, and will set it floating in the water; he will then contemplate this fragment, remaining stationary at a little distance, and will hover like a kestrel over a mouse, supported by the incessant fan-like motion of his pectoral fins: should the fragment bear this rigid inspection he proceeds to utilize it; sometimes, however, the fragment does not meet with his entire approval, and then it is at once abandoned. Mr. Kinahan has observed that after a fragment has been thus abandoned by one

fish no other will use it; they take hold of it, examine its capabilities, and invariably reject it; thus proving that these little creatures have some instinctive knowledge of its adaptability or otherwise to the purpose required; the occupations of searching, finding, testing, examining, selecting and rejecting materials seems incessant; sometimes, however, it will be interrupted by the appearance of an intruder, who is immediately made an object of attack, seized, bitten, and compelled to retreat: the victor will chase him round the glass for a few seconds, and then return and survey his building; he is ever suspicious that it may have suffered injury during ever so short an absence, and will hang in water, like a *Syrphus* in air, with his head pointed towards his nest, until he is assured that his nursery is intact: this *Syrphus*-like suspension is well worth studying; the little fellow, although perfectly still at intervals, will often, with a kind of start, change his position, and take up a new one on the other side of the glass, but still with his nose pointing towards the object of attraction, "true as the needle to the pole," and there he will hang hovering, and winnowing the water with his fins, just as he had hung hovering before. After awhile, assured that his building is intact, he will resume his architectural labours. How often have I seen him, like a tailor-bird, carry some little plant-fibre, or perhaps a fragment of thread which I had dropped into the water for his especial use and benefit, and watched him pass the end through and through the walls of the nest, until it was adjusted to his mind; how often have I seen him stop when his body was half-way through the nest, his head projecting on one side, and his tail on the other; how often have I wondered by what seemingly miraculous power he passed through the nest he had taken so much pains to construct—yes! pass through it in any direction, as though, like Pepper's ghost, the nest itself were an "airy nothing" which offered no resistance to his compact body, thews and sinews, muscles and spines. From time to time would he come forth, his eyes flashing fire, his breast glowing with rosy red, and if no disturbing element was near would contemplate his work with unmixed satisfaction; then he would go to work again.

The question when or how the eggs are deposited, whether before or after the building of the nest, is by no means finally ascertained. Something like a love chase occasionally takes place, proving that fishes are not altogether insensible to the tender passion, but such

scenes are rarely witnessed, and only revealed to those who have an unlimited allotment of time and patience: I have seen a male seize a female by the small of the back, by which I mean that slender part of the body which succeeds the last dorsal fin and precedes the caudal fin; and sometimes also by the sharp spike or spine which we call the ventral fin, and having thus seized her he seems disposed to say by force, not by words, "Come into my bower;" but these scenes are not understood: as I have already said, we know next to nothing of the loves of the fishes, and only imagine them by the results. As to the period required by the eggs in coming to maturity, we have evidence of a rather partial kind: "Mr. Gratton had a fine brood hatched in fourteen or fifteen days, the nest having been formed immediately after the introduction of the fish." This is the only record I possess.

These little fishes are wondrous creatures when they first assume the parental figure; they look like spicules of silver or bright motes in sunshine, as they float in your aquarium: no one seeing them for the first time, and without the aid of a magnifier, could imagine them to be fishes: then as to number; we are accustomed to count the spawn of fishes by thousands and hundreds of thousands, but I think this is not the case with sticklebacks; I have taken some pains to ascertain, and have concluded that the average number of a brood does not exceed twenty: I have never counted more than fourteen. But I admit they may be more numerous: I have caught hundreds of these atomic fishes in my water-net, but then I know not how many broods composed the school.

One word more: in 1843 Mr. Frederick Holme, then at Oxford, published (Zool. 200) his account of keeping water-beetles in confinement: no description of the prison-house is attempted, but Mr. Holme speaks of it as a "glass": he says of his prisoners, "They speedily become familiarized to a certain extent, and will follow the finger round the glass in expectation of food." He continued his observations during summer and winter for a long period. "When I kept a pair together," thus he continues, "I always found the male died first, and that his dead body had generally been mutilated and pretty nearly devoured by his widow. The females were at all times much more voracious than the males. I generally fed them with raw beef, of which they sucked the juices, but in summer I sometimes supplied them with small aquatic insects, which they seized with their fore feet and tore to pieces

with their mandibles, rejecting the elytra and other hard parts." It will be seen from several expressions in this brief account that Mr. Holme's observations were continuous, extending over summers and winters; we also learn with pleasure that the widows of water-beetles are not utterly inconsolable. I wish here to invite attention to the fact that up to this period (1844), although the aquarium was thoroughly utilized, more so indeed than ever since, its name had not been mentioned.

EDWARD NEWMAN.

(To be continued.)

Harvesting Ants and Trapdoor Spiders: Notes and Observations on their Habits and Dwellings. By J. TRAHERNE MOGGRIDGE, F.L.S. London: L. Reeve & Co. 1873.

Passages from the Ancients affirming the Harvesting Habits of Ants:—

"Go to the ant, thou sluggard; consider her ways, and be wise: which having no guide, overseer, or ruler, provideth her meat in the summer, and gathereth her food in the harvest."—*Proverbs of Solomon*, vi. 6—8,

"The ants are a people not strong, yet they prepare their meat in summer."—*Id.*, xxx. 25.

"The provident one, the ant, harvests the grain."—*Hesiod, Works and Days*, 776.

"The ant is neither ignorant nor careless of the future."—*Horace, Satires I.* 33.

"The beach is covered o'er
With Trojan bands that blacken all the shore;
On every side are seen, descending down,
Thick swarms of soldiers, loaded from the town.
Thus in battalion, march embodied ants,
Fearful of winter and of future wants,
T' invade the corn and to their cells convey
The plundered forage of their yellow prey.
The sable troops along the narrow tracks,
Scarce bear the weighty burthen on their backs;
Some set their shoulders to the ponderous grain;
Some guard the spoil; some lash the lagging train;
All ply their several tasks, and equal toil sustain."

Virgil, Æneid, iv. 400.

"*The Ants and the Grasshopper*.—Once in winter time the ants were sunning their seed-store, which had been soaked by the rains. A grasshopper saw them at this, and being famished and ready to perish, he ran up and begged for a bit. To the ants' question, 'What were you doing in summer, idling, that you have to beg now?' he answered, 'I lived for pleasure then, piping and pleasing travellers.' 'O, ho!' they said, with a grin, 'dance in winter if you pipe in summer. Store seed for the future when you can, and never mind playing and pleasing travellers.'"—*Æsopica Fabulæ*, Tauchnitz Edition, p. 92.

"In summer time, after harvest, while the ears are being threshed, the ants pry about in troops around the threshing floors, leaving their homes, and going singly, in pairs, or sometimes three together. They then select grains of wheat or barley, and go straight home by the way they came. Some go to collect, others to carry away the burthen, and they avoid the way for one another with great politeness and consideration, especially the unburthened for the weight carriers. Now these excellent creatures, when they have returned home and stored their galleries with wheat and barley, bore through each grain of seed in the middle; that which falls off in the process becomes a meal for the ants, and the remainder is unfertile. This these worthy housekeepers do lest when the rains come the seeds should sprout, as they would do if left entire, and thus the ants should come to want. So we see the ants have good share in the gifts of Nature, in this respect as well as others."—*Ælian de Naturâ Animalium*, ii. 25.

"The ants not only store the seed, but bite out that beginning or point from which the plumule springs in a grain of wheat."—*Aldrovandus, De Insectis*, lib. v., *de Formicis*.

This last-named author also mentions a certain Simon Mariolus, who, "in his most pleasant and learned work, introduces a philosopher as taking his walks abroad and examining an ants' nest with its seed-store." In a word, the foregoing passages so exactly describe what Mr. Moggridge has recently observed that they have the appearance of having been written to confirm his statements, rather than of having existed centuries before our author entered on his praiseworthy task. I now proceed to quote

Passages from the Moderns denying the Harvesting Habits of Ants:—

"When observers of Nature began to examine the manners and economy of these creatures more narrowly, it was found, at least with respect to the European species of ants, that no such hoards of grain were made by them; and, in fact, that they had no magazines in their nests in which provisions

of any kind were stored up."—*Kirby and Spence, Introduction to Entomology*, 7th Ed., p. 313.

"Do not let us attribute to the ant a useless prescience. Torpid during the winter, why should she make provision for that season?"—*Latreille, Natural History of Ants*.

"I am naturally led to speak in this place of the manner in which ants subsist in the winter, seeing we have relinquished the opinion that they amass wheat and other grain, and that they gnaw the corn to prevent it from germinating."—*Hüber on Ants*.

"The curious idea, which seems to have commenced in very remote times, and to have been carried down by tradition, and which was assisted by the results of careless observations, concerning the habit of the ants in collecting and storing up provisions, as it were, under the influence of a wise foresight, is evidently incorrect."—*Emile Blanchard, Transformations of Insects*, p. 196.

A great many other authorities might be cited, but none can be more decided or more to the purpose than that of William Gould, for he not only shows, or believes that he shows, that Solomon was mistaken, but explains how the mistake arose: he traces the error to its source, and states that the cocoons which ants carry again into their nests, after having been sunned on a fine day, were supposed by Solomon and his successors to have been grains of wheat, poor simpletons! and "his accurate observations," say Kirby and Spence, "were among the first which led to a correction of the error," and so Solomon was "put down" as we "put down" a naughty Sunday-school child who has been telling a story. This is the way with those who are wise in their own conceit. No one ever announced a discovery at a scientific meeting but it was "put down" in this manner, and I have now for twenty years abstained from attending all such meetings, perhaps *first*, because I don't like to be snubbed, contradicted and ridiculed, and *secondly*, because I don't like to see others treated in this way. Nothing has tended so much to depress and retard the progress of Entomology in this country as the practice of snubbing beginners, and hence we are behind the whole world in our knowledge of that Science. Germans, French, Italians, Russians, Americans, have passed us in the race for knowledge, because those who ought to be leading us on are perpetually holding us back. The explanation of the discrepancy

between the ancients and their critics, between skilled observers and pragmatic teachers, is very simple; it is this: the observer, convinced of the accuracy of his observations and conscious of the truth of his assertions, cared nothing about supporting by details facts that were patent to all, and which he could not dream would be called in question; and the moderns, led by the *ignis fatuus* scepticism, believed only what they saw or received from some authority equally pragmatic with themselves.

Mr. Moggridge gives all the passages I have cited *pro* and *con*, and gives them with a candour and clearness which naturalists must admire, even though they reject his conclusions, and it is very possible some such may be found, for scepticism is more confident than faith; disputation more congenial than concurrence. He determined to ascertain the truth, and to decide for himself whether the historians or the sceptics were in the right. On previous occasions he had obtained what he considered conclusive evidence of the harvesting instinct of ants, but at that time was not aware that the fact had been called in question; and that our more able observers, such as those I have cited, and "at the present day Mr. Frederick Smith, had by close scrutiny of the habits of these creatures proved that, wherever personal investigation had enabled them to put the matter to proof, no trace of harvesting was found." It is the more remarkable that this absence of evidence in any particular district or county should have led to the rejection of conclusions to be drawn from a mass of facts observed, even in our own time, by Colonel Sykes, Dr. Jerdon, Mr. Charles Horne, Dr. Buchanan White, and others.

Mr. Moggridge was further incited to the investigation by certain remarks made by Mr. Bentham, in his presidential address to the Linnean Society in 1869, wherein that gentleman called attention to the want of reliable information as to the existence of such accumulations of seeds as are popularly supposed to account for the sudden appearance on railway cuttings, gravel from deep pits, and the like, of crops of weeds hitherto unknown in a district: he suggested that it might repay the trouble if some accurate observers were to take this matter in hand and examine samples of undisturbed soil taken from various depths. It seems to have instantly occurred to Mr. Moggridge that a harvesting habit he had witnessed in the ants at Mentone, might afford an explanation; he determined to pursue the enquiry, and this book is the result.

He again visited the scene of his observation in the South of France, and thus describes what he saw:—

“I had scarcely set foot on the *garrigue*, as this kind of wild ground is called to distinguish it from meadows or terraced land, before I was met by a long train of ants, forming two continuous lines, hurrying in opposite directions, the one with their mouths full, the other with their mouths empty. It was easy enough to find the nest to which these ants belonged, for it was only necessary to follow the line of ants burdened with seeds, grain, or entire capsules, which had their heads turned homewards; and there sure enough, at about ten yards distance, and partly shaded by some small *cistus* bushes, lay the nest, to and from the entrances of which the incessant stream of in-comers and out-goers kept flowing.”—P. 16.

In this passage it will be observed that no mention is made of the storehouse and store; it shows that the ants were travelling loaded in one direction and returning unladen in the other; but what became of the loads of which they had disposed does not appear: the inference to be drawn is that these loads were deposited in the interior of the nest, but Mr. Moggridge determined to leave nothing to inference, nothing to be surmised; that had been the great error which it was his mission to dissipate. He noticed, as had previously been done by Colonel Sykes, on the outside of the nests, large heaps of rubbish, consisting of a variety of objects, little lumps of earth, gravel and plant-refuse: he calls them “kitchen middens”; the greater proportion of these collections consisted of parts of grasses and seeds which had evidently been rejected as useless: in many instances the albuminous portion of the seeds had been abstracted, and the husks brought out and thrown on the “midden.” It became of course an object of great importance to know what had become of the selected portion of the produce of the harvest-field. He determined that this object should be attained by selecting a nest where the coarse and hard rock, lying near the surface and barring their downward course, compelled the ants to extend their nests in a horizontal direction. Here he commenced his excavations, and with a most satisfactory result.

“Almost at the first stroke, I came upon large masses of seeds carefully stored in chambers prepared in the soil. Some of these lay in long sub-cylindrical galleries, and, owing to the presence in large quantities of the black, shining seeds of amaranth (*Amaranthus Blitum*), looked like trains of gunpowder laid ready for blasting.”—P. 22.

This was exactly what was required; the excavator spread out his treasure, and proceeded to ascertain, with the most scrupulous attention, what were its component parts. We may readily imagine the interest with which the inspection was made.

“On carefully examining a quantity of the seed, grain and minute dry fruits taken from the granaries, I found that they had been gathered from the following plants:—fumitory (*Fumaria capreolata*), amaranth (*Amaranthus Blitum*), Setaria, and three other species of grasses, moneywort, *Alyssum maritimum*, Veronica, and from four unrecognised species, one of which was a pea-flower. There were therefore in this nest seeds which had been taken from more than twelve distinct species of plants, belonging to at least seven separate families. The granaries lay from an inch and a half to six inches below the surface, and were all horizontal. They were of various sizes and shapes, the average granary being about as large as a gentleman's gold watch. I was greatly surprised to find that the seeds, though quite moist, showed no trace of germination, and this was the more astonishing as the self-sown seeds of the same kind as those detected here, such as fumitory, for instance, were then coming up abundantly in gardens and on terraces.”—P. 23.

Mr. Moggridge confesses his difficulty in explaining the sound condition of many of the seeds found under circumstances so favourable to germination. In the examination of many thousands of grains and seeds taken at different times from the stores of twenty-one distinct nests, he only found traces of germination in twenty-seven, and of this number eleven had been mutilated in such a way as to arrest their growth. The sprouting seeds were found from November to February, while in the nests opened in October, March, April and May, no indications of germination were found, although the temperature and moisture of these months seemed highly favourable to germination. It is extremely rare to find other than sound and intact seeds in these granaries, and Mr. Moggridge consequently arrives at the somewhat vague and unsatisfactory conclusion that “the ants exercise some mysterious power over the seeds which checks the tendency to germinate.” The fact is the more puzzling since it was clearly proved that the vitality of the seed was not affected by this storing. On two occasions he tried the experiment. In the first instance the seeds were taken from a granary about four inches below the surface of the ground on the 10th of November, and sowed two days afterwards, and several of them had come up by the 1st of December.

In the second instance seeds found an inch and a half below the surface of the ground on the 29th of December, 1871, and sowed in England on the 18th of June, 1872, came up in large numbers ten days afterwards. Some seeds had the radicle gnawed off at its base, and these were sometimes brought into the sunshine, and after being thoroughly dried or *malted*, their starch being converted into sugar, they were again taken into the recesses of the nest. Seeds thus *malted* are devoured by the ants with great avidity.

“It is, however, certain that, though a few individual seeds may sprout in the nests from time to time, either with or without the concurrence of the ants, the great mass remains for many weeks, or even months, quite intact, neither decaying nor germinating; whereas everyone knows that, if a quantity of seeds are placed in the soil in a moist and warm place, all the seeds that are of one kind will almost simultaneously begin to grow after the lapse of a fixed interval.”—P. 26.

I have found in so many works accounts of “the battles of the ants” that the part of Mr. Moggridge’s work which treats of these wars contains little that is positively new to me, or will be so to many of my readers; yet the narrative which I extract below has another interest—it shows that the harvesting economy of ants, the collecting and storing grain, the disposition to plunder the possessions of others or to defend their own, are the inciting causes of all their wars; our ant-historians, Hüber, Gould, Latreille, Kirby, and others, who constitute themselves authorities on the events of the wars, have failed to see the *casus belli*, the real object of the belligerents: had it been otherwise they could not have doubted that the ancients were correct in all their assertions, still less would they have called in question the wisdom of Solomon. Like the entomologists I have named, Mr. Moggridge was an eye-witness of these combats, and also of the marauding spirit and doings in which the wars originated. I should call them campaigns rather than battles, seeing that the ants sometimes would carry on the war day after day, week after week; a campaign, the events of which were duly noted, lasted forty-six days, namely, from the 18th of January to the 4th of March, both inclusive. He visited the seat of war twice a week for six weeks, and, constituting himself “our special correspondent,” gives the following description:—

“An active train of ants, nearly resembling an ordinary harvesting train, led from the entrance of one nest to that of another lower down the slope

and fifteen feet distant; but, on closer examination, it appeared that, though the great mass of seed-bearers were travelling towards the upper nest, some few were going in the opposite direction and making for the lower. Besides this, at intervals, combats might be seen taking place, one ant seizing the free end of a seed carried by another, and endeavouring to wrench it away, and then frequently, as neither would let go, the stronger ant would drag seed and opponent towards its nest. At times other ants would interfere and seize one of the combatants and endeavour to drag it away, this often resulting in terrible mutilations, and especially in the loss of the abdomen, which would be torn off, while the jaws of the victim retained their indomitable bull-dog grip upon the seed. Then the victor might be seen dragging away his prize, while his adversary, though now little more than a head and legs, offered a vigorous, though of course ineffectual, resistance. I frequently observed that the ants during these conflicts would endeavour to seize one another's antennæ, and that if this were effected the ant thus assaulted would instantly release his hold, whether of seed or adversary, and appear utterly discomfited. No doubt the antennæ are their most sensitive parts, and injuries inflicted on these organs cause the greatest pain. It was not until I had watched this scene for some days that I apprehended its true meaning, and discovered that the ants of the upper nest were robbing the granaries of the lower, while the latter tried to recover the stolen seeds both by fighting for them and by stealing seeds in their turn from the nest of their oppressors. The thieves, however, were evidently the stronger, and streams of ants laden with seeds arrived safely at the upper nest, while close observation showed that very few seeds were successfully carried on the reverse journey into the lower and plundered nest."—P. 38.

Mr. Moggridge contrived to imprison a colony of *Atta barbara*, the species on which he made most of his researches, but found great difficulty in gaining much knowledge of their subterranean life: he concludes that on one occasion he saw them actually eating, but although there is nothing very unreasonable, or improbable, or unnatural in an ant condescending to take food, it is a fact not clearly established previously: the theory generally received is that the depredations of pismires on our sugar-basin, our plums, peaches and pears, are rather for the benefit of their progeny than of themselves; however, we will hear what can be said on the subject, and I am sure every reader will give the writer credit for the utmost painstaking as well as scrupulous exactness.

"The ants were in the habit of coming out in numbers of an evening to enjoy the warmth and light of my lamp, and it was on one of these

occasions that I first observed them in the act of eating. I perceived that, in the midst of the black mass of ants gathered together on the side of the glass jar, one was holding up a white roundish mass about as big as a large pin's head. Having turned a stream of bright light, passed through a condenser, on this group, and being permitted by the ants to make a free use of my pocket lens, I was able to see the details with great precision. The white mass appeared to be the flowery portion of a grain of millet, and I could see that two or three ants at a time would scrape off minute particles with their toothed mandibles, and take them into their mouth, repeating the operation many times, before giving place to other ants, and often returning again. It certainly appeared to be a *bonâ fide* meal that they were making, and not merely an act performed for the benefit of the larvæ, as when they detach crumbs from a piece of bread and carry them below into their nest."—P. 46.

The trapdoor spiders must inevitably wait another month; they are crowded out of this, but I assure them they shall not be forgotten.

EDWARD NEWMAN.

(To be continued.)

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 3558.)

MAY, JUNE AND JULY, 1873.

Dotterel (*Endromias morinellus*).—A friend informs me that he saw a trip of about twenty-five on the wolds on Sunday, April 27th. This is about the time for their appearance during the spring migration.

Stock Dove.—Far more common than formerly; several now come regularly every day into the marshes, from the woods and plantations on the wolds, to feed in recently-sown fields of peas and tares.

Turtle Dove.—The turtle dove has nested for the last two or three years in a small and very sheltered wood in this neighbourhood, where they will be strictly preserved. This is the first instance I have met with of their nesting in North Lincolnshire.

Nightingale.—Several heard during the month.

Swift.—Very late in arriving at their nesting-haunts; first observed inland on the 16th; on the 19th at Great Cotes; wind N., wild and strong; temperature very low for season.

Garden Warbler and Sedge Warbler.—May 19th. First heard.
Spotted Flycatcher.—May 23rd. First seen.

Hooded Crow.—May 16th. A single bird in one of the plantations this morning. I have reason for thinking this may have remained behind to nest. This afternoon (August 5th) I found and shot at a young hooded crow in one of my fields; it was not fully fledged, and weak on the wing: although badly hit it managed to get off, by falling beyond a high fence into a crop of wheat, where I afterwards spent much time in an unsuccessful search. The same day, in the morning, when riding round the farm, I saw either this or another perched on a gate-post and examined it through my binocular.

Godwit, &c.—May 24th. Bartailed godwit, knot, gray plover and dunlin on foreshore, in summer plumage; whimbrel on grass-lands in considerable flocks; gray plover numerous on flats. None seen after this date.

Cuckoo.—More than usually numerous.

Hobby.—May 24th. I saw one this morning in chase of a small bird.

White or Barn Owl.—A pair have nested this season, for the first time, in an old elm adjoining my yard. The eggs, three in number, were laid on rotten wood and the castings of the bird, in a hole made by the breaking away of a rotten bough. On the 5th of May I found two nestlings in the down and an addled egg. The smell from the place was most offensive. The old owl came regularly each evening about 8.40 to feed the young, an operation which was conducted with much snoring and hissing on the part of the latter: their food was mainly the common mouse and short-tailed field vole, occasionally varied, I believe, with a *young rook* taken from the nest. Until the second brood were hatched only one of the parent birds appeared to take any part in carrying food: I watched them closely nearly every evening, and never saw more than one thus employed: after this, however, both old birds came and took part in the feeding. In the same tree were two starlings' and five rooks' nests; also many of the latter on the neighbouring trees. On two or three occasions I have seen the owl glide through the tree-tops over the nesting rooks, a proceeding which has been the signal for a regular onslaught and chase round the premises and garden, the pursued finally taking refuge in a large old yew, where he was secure from attack. Once the rook-driven owl passed

so close to my face that I distinctly saw either a young rook or some other bird in his claw. A day or two later I found the remains of a nestling rook under the owl's quarters, and in such a position that it could not have fallen from any nest; later I took part of the skull and beak of a nestling from the castings, wrapped up in a lot of mice fur and bones. The first pair of owlets did not leave the nest, not even to perch in the tree, till fully fledged, on the 1st of June: at this time there was a second pair hatched off in the hole. I conclude the first pair must have materially assisted in incubation, as I can scarcely think their den could have held three full-sized owls. The first pair certainly did not leave the nest till long after the second were hatched; they used to come out regularly about 8.30 each evening, beating round the paddocks and garden, much as the old birds did, and being fed by them on the neighbouring trees. The second pair got away about the end of June: since this time I have not seen them.

Brownheaded Gull.—June 30th. Saw the first young of the year on the foreshore.

Heron.—July 1st. Several young herons, birds of the year, in the marshes.

Green Sandpiper.—July 8th. There was a single green sandpiper on the beck this afternoon.

Whimbrel.—July 12th. We have had whimbrel on the coast all through the summer. This evening, at 8.30, two flocks passed over the yard towards the Humber flats.

Pochard (*Fuligula ferina*).—July 12th. There was a fine old male, in full plumage, swimming close to the embankment this morning.

Redshank.—July 21st. I hear the wild "chirrup" of the redshank on the flats. With my binocular, I was watching one this morning feeding on the muds under the embankment. What a pretty bird it looks in its delicately shaded and pencilled dress and bright coral legs, as it daintily steps over the semi-fluid ooze, scarce leaving the imprint of its feet behind,—now wading through some shallow pool, or standing awhile and jerking its head and body, much after the fashion of the common sandpiper,—ever and anon, too, picking out some small worm-like object from the mud. I subsequently found this to be a small annelid about an inch in length: the flats in places were pitted with their minute holes, which I at first mistook for the borings of some wader, but looking

more closely saw what looked like minute flashes of light shooting over the ooze, this appearance being due to hundreds of small reddish worms, which were perpetually emerging and as rapidly retracting, each from its own little boring; their motions were so rapid that it was difficult to follow them. The redshank was gathering these, not from the surface (for they were much too quick even for the nimble wader), but by probing the mud. On withdrawing the worm, which was held crosswise, I saw the bird frequently wash it before swallowing, which was done by shaking it under water in the shallow pools left by the receding tide. The heat this day was tremendous, the thermometer standing at some degrees above 80 in the shade; the mud-flats steamed and reeked under the noonday glare, the hot air over them quivering like the blast from an iron-furnace.

Guillemot, &c.—On the 10th of July there were many guillemots and razorbilled auks, with their young,—many of these still unable to fly,—along the coast of Holderness and Lincolnshire.

Turnstone.—August 2nd. I saw small family parties of young turnstones and a few old birds on the Spurn coast this morning. They are most active in their motions when looking for food, running rapidly to and fro amongst the masses and ridges of tide-driven wrack and sea-weed, which they keep perpetually probing and turning over in their search for insects and sand-hoppers.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire.

Rare Birds near Barnsley.—The closing months of last year and the opening ones of the present have given opportunities to observe many birds rare to South Yorkshire, of which Barnsley is the centre. This has been especially the case with swimming and wading birds, whose appearance in such unusual numbers was occasioned by the changeful season. The chief of these have been the little bittern, at Hiendley Reservoir, on the 26th of August, 1872; the blackheaded gull, at the same place, on the 17th of September; the reeve, at Barugh, near the Barnsley Canal, on the 30th of August; four tufted ducks, at Dunford Reservoir, on the 30th of October; the common scoter (not observed in this part for many years), at Dunford Reservoir, on the 18th of November; a pair of little grebes, or dabchicks, at Cannon Hall Pool, also a pair of longeared owls near West Melton, and a shorteared owl at Mapplewell, on the same date; the great crested grebe, at Bolton-on-Deerne, on the 30th of November; the greater and lesser

spotted woodpecker, in Dearne Woods, on the 26th of December; the velvet scoter (or velvet duck), the pochard, scaup and tufted ducks, on Hiendley Reservoir, on the 25th of January, 1873; the goldeneye, golden plover and lesser grebe, with hundreds of coots, on the 1st of February, on this fine sheet of water, belonging to the Barnsley and Wakefield Canal Company; the waxwing (or Bohemian chatterer), at Cannon Hall Park, on the 12th of February; a pair of great crested grebes, at Worsbro' Reservoir, on the 19th of April. I regret that the last-named and many of the above were shot.—*T. Lister; Barnsley.*

Orangelegged Hobby, &c.—As it is always a matter of interest to ornithologists to know where rare species of British birds are located, perhaps you will allow me to record that the specimen of the orangelegged hobby (female), mentioned in your last as having been killed at Alresford, near this town, and all the four specimens of pintailed sand grouse (*Syrhaptus paradoxus*) killed in Essex in 1863,—one male and two females at Mersea (see Prof. Newton's paper, 'Ibis,' 1864), and one female killed at Peldon, near here, but not mentioned in that account,—have been added to my private collection.—*C. R. Bree; Colchester, July 12, 1873.*

Montagu's Harrier at Alderney.—One of these birds was shot at Alderney last week: it is an adult male, in full plumage. I saw it at Mr. Couch's, who has preserved and stuffed it.—*C. B. Carey; Candie, Guernsey, July, 1873.*

Missel Thrushes Nesting in Rocks.—These birds are very rare visitants to our neighbourhood excepting in hard winters, and then they are not numerous. Last year, however, a pair built a nest on a small ledge or niche on a perfectly bare rock at the entrance of St. David's Harbour; but what became of the brood I am unable to say, as I never saw one of the young ones on the wing. This season a pair (probably the same) built their nest over the old one, and although within a few yards or even feet of where vessels trading to the harbour continually passed, yet they successfully "brought down" a brood of fine young ones, which I have repeatedly seen on the wing in the neighbourhood of the nest. I may as well add that this district is almost entirely destitute of trees—so much so that it is an old adage "that whoever cuts a horse-rod in St. David's parish is liable to a fine of five pounds," and that for a very good reason, for there are none to be had.—*Samuel Williams; St. David's, July 25, 1873.—From the 'Field' of August 2nd.*

Yellowhammer's Nest in a Fruit Tree against a Wall.—On the 25th of July I found, in a garden in Fifeshire, two yellowhammers' nests built in fruit trees against the garden wall, the one five feet and the other seven feet from the ground. The latter was placed on the remains of a black-bird's nest which had been destroyed.—*Walter T. Ogilvy; British Museum, August 11, 1873.*

[I have this spring had a pair of yellowhammers build in ivy on a wall inside my bird cage.—*E. Newman.*]

A new Bird of Paradise, *Drepanornis Albertisii*.—In the 'Sidney Mail' Signor Luigi Maria D'Albertis gives the following account of a new bird of paradise discovered by himself in New Guinea:—"Among other birds obtained at Atam, I may mention a new species of bird-of-paradise, which perhaps may even prove to be a new genus. I secured only a male and female, which have been transmitted to the Zoological Society of London by the last April mail steamer, and they are unique specimens. It is evidently a very rare bird, for many of the natives did not know it, but others called it 'Quama.' The peculiarity of this bird consists in the formation of the bill and the softness of the plumage. At first it does not appear to have the beauty usually seen in the birds of this group, but when more closely observed, and under a strong light, the plumage is seen to be both rich and brilliant. The feathers that arise from the base of the bill are of a metallic green and of a reddish copper-colour; the feathers of the breast, when laid quite smooth, are of a violet-gray, but when raised form a semicircle round the body, reflecting a rich golden colour. Other violet-gray feathers arise from the flanks, edged by a rich metallic-violet tint; but when the plumage is entirely expanded the bird appears as if it had formed two semicircles around itself, and is certainly a very handsome bird. Above the tail and wings the feathers are yellowish, underneath they are of a darker shade. The head is barely covered with small round feathers, which are rather deficient behind the ears; the shoulders are of a tobacco-colour, and underneath the throat of a black blending into olive-colour; the feathers of the breast are violet-gray, banded by a line of olive, and those of the vent white. The bill is black, eyes chestnut, and the feet of a dark leaden colour. The food of this bird is not yet known, nothing having been found in the stomachs of those I prepared but clear water." In 'Nature' for August 14th, Mr. Sclater gives a more detailed description, and another is still to be published in the forthcoming part of the 'Proceedings of the Zoological Society.' Mr. Sclater, in the same number of 'Nature' thus announces the discovery of a second new species by M. D'Albertis:—"Besides this paradise-bird, M. D'Albertis procured from the natives, in the vicinity of Orangeri Bay, on the western coast of New Guinea, opposite to Salawatty, two imperfect skins of a second apparently new species. This is a true *Paradisea*, nearly allied to the greater and lesser birds-of-paradise (*P. apoda* and *P. papuana*), but having the long lateral plumes more of an orange-red, as in *P. rubra*. These skins were likewise exhibited at the Zoological Society's meeting on June 17 last, and the species, in accordance with M. D'Albertis' wishes, was proposed to be called *Paradisea Raggiana*, after the Marquis Raggi."

Nutcracker in Somersetshire.—It may interest your ornithological

readers to learn that, on the 4th instant, a nutcracker (*Nucifraga caryocatactes*) was observed by myself and others flying over the Kingscliffe Woods, about two miles from North Petherton. We had a good view of it for upwards of a mile, and repeatedly heard it utter its shrill discordant note. There is a record of one having been seen in this county some seventy years ago; but so far as I can learn no recent examples have been observed here.—*T. Cosmo Melville; Maunsell House, near Bridgwater.*—‘*Field,*’ August 16.

Extraordinary Flight of Swifts.—A correspondent writing to me from Brighton says—“A strange sight was visible here on June 30. For hours there was a continuous flight of swifts from east to west. There must have been some thousands of them, and I think I saw more swifts on that afternoon than I ever saw before in my life. What could have been the cause of this? Surely it was too late in the season for fresh arrivals to this country.”—*F. Bond; 203, Adelaide-road, N.W.*—‘*Field,*’ July 26.

Extraordinary Flock of Swifts.—Your correspondent F. Bond remarks on the enormous number of swifts which passed over Brighton on the 30th June last, and it may be interesting to him and other of your readers to know that on the following morning about 5.30, when walking up to Hyde Park, I saw immense numbers of these birds flying to the westward, at about a hundred yards above the ground, passing over the lower end of Prince Albert’s-road and the Brompton-road. There must have been from fifteen hundred to two thousand of them, and in all my observations of birds and their habits I never saw such a congregation of this species. Can any one give a reason for such an assemblage, so late for a spring arrival, and so early for an autumnal departure?—‘*Field,*’ August 2.

Stock Dove breeding in Confinement.—My friend Mr. Harrison Weir has been successful in breeding the wild stock dove: he purchased two, a male and female, at different times and in different places; from the beginning they were quiet and semidomestic in their manners, and seemed at once reconciled to confinement. They paired in April, and the season of courtship presented some rather noticeable features; the male raised his wings and tail, the latter being spread so as partially to conceal the former, whereas among domestic pigeons, and I suppose the same habit obtains with *Columbia livia* in the wild state, the tail of the male is depressed during courtship, and the points of the feathers are scraped along the ground. No nest was made, but a single feather was laid on the sawdust provided for the eggs, which the female seemed very reluctant to lay; the male kept her in the nesting-box three days before this event took place; when she escaped from her prison-house now and then to feed, he buffeted her with his wings until she returned, and the blows he inflicted were by no means light ones; at length an egg was deposited, and then another; they were rounder and smaller than those of the domestic pigeon: after this she sat with exemplary

patience. The young ones were hatched in about sixteen days; when they first emerged from the egg they had a little yellow down on their bodies, very little indeed, but just enough to say they were not quite naked; the legs and back were flesh-coloured, but in three days changed to dark purple, and this colour gradually altered, and has now turned to the usual red; the beak has become bright yellow, inclined to red. The young birds are now able to fly strongly, and the old ones are breeding a second time. This species seems to have been imperfectly understood by our publishing ornithologists. Bewick makes but three species of *Columba*; he calls them *Œnas*, *Palumbus* and *Turtur*. Montagu also has but these three species (see my edition of Montagu, p. 57): thus one species is omitted, and Mr. Yarrell attempts to account for the omission in the following words:—"Montagu appears to have considered the Rock Dove and Stock Dove but as one species, applying the trivial name *Œnas* to the Rock Dove, which is truly described, and giving no description of the Stock Dove. Bewick has figured the Rock Dove under the specific name *Œnas*, and remarks that 'the Stock Dove, Rock Pigeon and Wood Pigeon, with some small differences, may be included under the same denomination.'" This seems scarcely satisfactory. I agree with Yarrell in rejecting Bewick's view of combining the three, but cannot agree with him in saying that "the Rock Dove is truly described" under the name of *Œnas* by either author, for Bewick clearly lays down as a distinctive character of *Œnas* that "the lower part of the back and the rump are light gray or ash-colour," and he has tinted the figure in order to represent this colour. Now if I were asked to distinguish *Livia* from *Œnas* by any single character, I should say that *Livia* always had the lower part of the back pure white, and *Œnas* always gray or ash-coloured: I believe the white patch of the former is the most difficult character to eradicate in our domestic pigeon, and at the same time it is one of the most unmistakable proofs of its descent from *Livia*, or the rock dove. Of the accuracy of Bewick's figure I have no doubt, but it was probably drawn from a stuffed specimen of the domestic pigeon. This particular variety closely resembles the Egyptian *Columba Schimperi* of Bonaparte.—*Edward Newman*.

Wild Pigeons Nesting in a Stable.—About ten days ago my gardener drew my attention to a pair of wood pigeons which were continually flying about an old stable—now a garden-house—not ten yards from the kitchen door. This garden-house is ventilated by wooden boxes let into the wall, and open at the top; and yesterday in one of these boxes I found two wood pigeons' eggs laid on the remains of a tomtit's nest of last year. The pigeons had made no nest for themselves, as there were but three small sticks in the box.—*'Field' of August 2.*

[The title of this note does not quite agree with the text. *Wild* pigeons may mean anything excepting tame ones; but the term "wood pigeons"

indicates, as I venture to suppose, *Columba palumbus*; and if this supposition be correct, it is an unlooked-for occurrence.—*E. Newman.*]

Redlegged Partridge plentiful in East Kent.—On the 1st inst. I was visiting at Smeeth, near Ashford, and in the course of my walks my attention was called to two partridges' nests, in which the young had been hatched this year. I saw at once from the egg-shells that both were the nests of the redlegged partridge (*Perdix rufa*). These two nests were within a hundred yards of each other. A third nest, very near the same spot, was mentioned to me, but I had not time to go and examine it. It appears that this species of partridge is on the increase in Kent, and, being difficult to shoot, will soon abound to the exclusion of the more valued common English partridge.—*James Murton; Silverdale, Carnforth, August 11, 1873.*

Waterhens Nesting in Trees.—In June last I found a waterhen's nest in a large yew tree by the side of a brook, at about nine feet from the ground. It contained eight or nine eggs, which were in due time hatched; and later on I saw the young birds in the brook. That they were the birds which were hatched in the yew I have no doubt, as there was no other nest anywhere near.—*T. E. Tatton; Cheshire, August, 1873.*

Bustard in Suffolk.—During the past few days a strange bird has been seen on the Wangford and Lakenheath warrens. The two gentlemen who saw it describe it as being nearly as large as a turkey, and of a rusty colour; in fact more like a turkey than anything else. When it flew it was a long time before it could rise from the ground. They could not get nearer than sixty or seventy yards to it. I have been over myself, but could not see the bird, the warrens being so very extensive. The labouring men in the district to whom I spoke confirmed the account previously received.—*William Howlett, in 'Field' of August 16.*

Ostrich-Farming at the Cape.—We saw the incubator, and in it forty-five eggs in the process of hatching. This operation is now performed to almost perfection, quite equal to anything the parent birds can do themselves, even supposing they are unmolested and escape all kinds of accidents to which they are exposed. Out of the forty-five eggs we saw, we may safely conclude forty-two would produce live and healthy chicks. The results now, of several batches, are fourteen out of fifteen to be hatched; and Mr. Douglass seems pretty sanguine that he shall presently hatch all the eggs placed in the incubator, provided they are fertile. The number of ostriches at Hilton is as follows: Breeding birds—males, 2; hens, 4; pullet, 1—total, 7. Full-grown and nearly full-grown birds, 14; one- and two-year-old birds, 59; this year's chickens, 75—total, 155. And though we have every respect for the old proverb, yet, with the experience aforesaid, we have every confidence in adding twelve more for the eggs now in the machine, besides which some of the hens are laying every day. They

laid last year up to May, when they were permitted to hatch a small clutch of eggs themselves, as it was thought they ought to have a rest from laying.—*Grahamstown Journal*.

Remarkable Posture of the Norfolk Plover.—The following note on the Norfolk plover, from the pen of Mr. Reynolds, who was living in Norfolk when this occurred, originally appeared in the 'Naturalist's Scrap-Book,' Liverpool district, some years ago, and is, I think, quite worthy of insertion in the pages of the 'Zoologist.' It is here reprinted, almost word for word, from the original. After stating one or two interesting facts with reference to the bird, he says :—"I have often observed in adult birds that the tail-feathers and under tail-coverts were much worn and rubbed away, and could not account for this until I kept some of the birds in confinement in my garden. A friend who was staying with me, a very good naturalist, whilst looking for them, discovered them resting on the entire length of the tarsus. My son being with him he sent for me, and I saw them in that position quite at rest. It then occurred to me at once that this was the reason of the worn appearance of the tail and under tail-coverts."—*H. Durnford* ; 1, *Stanley Road, Waterloo, Liverpool, August 7, 1873.*

A New Heronry in Cornwall.—Three pairs of herons commenced forming a new heronry last spring, building nests and rearing their young in Chevioc Wood, by the side of the St. German's River, Cornwall ; and the keeper, who took the greatest interest and pride in their preservation, said that it was quite wonderful to see how many flat fish, &c., brought by the old birds to feed their young, had fallen under the trees. Unfortunately I was not informed of this interesting circumstance until after the nestlings had flown, or I should certainly have visited the place. However, next spring I shall assuredly do so, when I hope to find the number of nests increased. There is an old-established heronry at Warleigh, a few miles distant, but on the Devonshire side of the river Tamar.—*J. Gatcombe* ; 8, *Lower Durnford Street, Stonehouse, Devon, August 14, 1873.*

Flamingo in the Isle of Sheppey.—Although this bird is well known in Europe, it has hitherto been considered an entire stranger to Great Britain, specimens in private collections being obtained from abroad. It will be interesting perhaps to many to learn that a female flamingo (*Phænicopterus ruber*) was on Saturday last shot at Elmley, Isle of Sheppey, full-winged, and measuring 4 ft. 6 in. in height. The plumage is perfectly white, excepting the wings, which are tinted with a beautiful rose-colour. It is now in the hands of Mr. George Young, naturalist, of Sittingbourne, for the purpose of being stuffed and mounted.—*Arthur John Jackson* ; *Sittingbourne, August 7.*—*'Field,' August 16.*

[I think Mr. Jackson may be mistaken in the specific name ; *P. ruber* is an American species ; the European species, *P. Antiquorum*, is more

likely to occur in England, as suggested by the Editor of the 'Field.'—*E. Newman.*]

Captain Feilden's Criticisms on Mr. Durnford's Ornithological Notes.—

In answer to Captain Feilden's criticisms, in the August number of the 'Zoologist' (S. S. 3643), on my notes in the July number, I will reply as shortly as possible. He is right in saying that in more than one instance I have gained my information second-hand, which he appears to speak of in very disparaging terms, though almost in the same breath giving us a second-hand note himself; but I believe my informants to be thoroughly trustworthy, and I think it must be evident to all the readers of the 'Zoologist' where I have done so. This is almost inevitable, when one can only pay a flying visit to any locality for the purpose of making ornithological notes, though one's own observations are undoubtedly the most valuable. On reading his remarks on my notes on the Sandwich tern, I immediately wrote to the tenant of the land on which these birds breed, but regret to say I have up to this time (Aug. 18th) received no reply. I can therefore now only repeat, it is my firm conviction that the eggs were given me as having been taken this season; and I can safely assert that on the 31st of May there were no Sandwich terns at their usual breeding-place on Walney Island, and the watcher who accompanied me assured me they had then nested and left the place. As regards the herring gulls, I stated that the adult birds which bred on the South Stack, near Holyhead, were very jealous of their tenements, "not even allowing their own young to nest amongst them." As the same number of birds (as nearly as can be judged) return year after year to this rock, it is a fair presumption that they are the same individual birds which have nested on it in former years: this of course cannot be proved, but it is extremely likely to be the case, as it is known to be the fact with swallows, and I believe with some other birds. Captain Feilden finds fault with me for employing the term "mallard" for the male of the shieldrake: I am aware this term is usually applied to the male of the wild duck, but as it was used by the lighthouse-keeper who told me the story I have reproduced it in my paper. Surely this note with reference to the breeding of the shieldrake cannot be unintelligible to Captain Feilden or anyone else, though possibly I might have expressed myself more clearly; "breeding-quarters" is obviously a misprint for "feeding-quarters," and I am sorry to say there are several such misprints in my notes, at which I express my regret, but they are, I think, in all cases so self-evident that I have not thought it worth while to correct them. Since writing the above on the herring gulls, I have read Bishop Stanley's account of their desertion from and return to the South Stack (Stanley's Birds, pp. 402—405), a portion of which I here reproduce:—"Upon this rock (the South Stack), which, before the erection of the lighthouse, was almost inaccessible, myriads of sea-fowl used to build, but when the works

were commenced, in 1808, the unusual appearance of persons on the island, with their noisy operations of blasting, so disturbed the proceedings of the birds recently arrived, that, with the exception of a solitary pair of gulls, the whole body, including guillemots and razorbills, took to flight. . . This solitary pair had taken post on an inaccessible ledge of bare rock, on the face of a precipice, and seemed to be aware that nothing but shot or stones could dislodge them. Their determined confidence in the security of their stronghold met with its due reward, orders being issued that none should molest them. The consequence was, they became quite familiarised to the noise and bustle, and remained until their young were reared, and in a condition to shift for themselves. In the ensuing spring, the same pair, as was supposed, retook possession of their old post, and strict orders were given on no account to disturb them ; and as a further protection no fire-arms were allowed to be used ; nor were strangers who disregarded these rules to be admitted again on the island. In consequence of a rigid attention to these humane regulations, the same pair continued, for five successive years, to visit this ledge, rearing their young, consisting generally of two and never exceeding three in number. But although only this single pair were observed to breed on the island, a considerable number, at times, as if aware of their security, sought the shelter denied them on the mainland, where, notwithstanding the bare and perpendicular character of the precipices, there was scarcely a spot amongst the clefts and hollows to which the young men and boys of the neighbourhood did not find their way, in search of eggs, for which they found a ready demand. The main body of gulls, at length finding that these wonted haunts no longer afforded security, either taught by the experience of the above pair, or by their own observations, in the spring of the sixth year took refuge on the island, chiefly at the south end, on an inclined plane of rock, where they have remained, during the breeding season, ever since ; and on this spot, in particular, their artless nests are spread in such numbers, that it is difficult, at times, to avoid treading on them." I shall not fail to let Capt. Feilden know the result of my inquiries concerning the Sandwich terns.—*H. Durnford ; Southwold, Suffolk, August 18, 1873.*

Larus cachinnans.—In a letter which I have received from my friend Von Heuglin, dated Stuttgart, August 2, 1873, he informs me that he has clearly proved that the above bird is a very distinct species from and having nothing in common with *Larus leucophæus*. The latter is a constant variety of our herring gull (*L. argentatus*), but smaller. Hartlaub and Finsch have confounded the one with the other. Blasius gives *Cachinnans* as a variety, *Argentatus* and *Leucophæus* as No. 49 of his varieties commonly considered as species. This determination of Von Heuglin will add a new bird to the European list. I have a nice series of four eggs of *L. cachinnans* from Southern Russia sent me through Von Heuglin. Each

egg differs in markings, and they all differ from the eggs of *L. argentatus* in markings.—*C. R. Bree.*

Cormorant Fishing.—In a letter lately received from my good friend M. Pierre Pichot, of Paris, is the following interesting bit of news relating to cormorant fishing:—"I have had this morning a very interesting letter from Mr. De la Rue, the forest inspector, who keeps our birds. He has been down to Chatellerault to fish a pond so much crowded with weeds that it was impossible to take any fish there, either by line or by net. So the master of the place, Mr. Trenille, one of our good masters of hounds, laid a wager of £25 with some friends that he would take fish there with Mr. De la Rue's cormorants; and accordingly De la Rue went down there last week, and won the wager most splendidly. But he tells me of a very interesting episode. His two cormorants are in full flight, and while standing at the foot of the Castle of Chitrée, whose ruins stand over the valley of the Vienne, which river runs at about one mile's distance, the cormorants espied the water in the valley, and one of them named 'Red' immediately took to his wings and flew towards the river. All the assistants believed the cormorant lost, but De la Rue calling out loudly to his bird, and waving his glove as a 'lure,' called him back instantly, and the cormorant, after having described a wide circle round the ruins, alighted at the feet of his master. This is the first time I have heard of a cormorant being flown like a hawk." I have for many years used trained cormorants for fishing, but never experienced a similar thing.—*F. H. Salvin, in the 'Field.'*

Introduction of European Birds in the United States for Economic Purposes.—"A very deserving institution has recently been established in Cincinnati, under the title of the Cincinnati Acclimatisation Society, its object being to effect the introduction of such foreign birds as are worthy of note for their song or their services to the farmer or horticulturist. The Society announces that during last spring it expended 5000 dollars in introducing fifteen additional species of birds, and that it had already successfully accomplished the acclimatisation of the European sky lark, which is stated to be now a prominent feature of the summer landscape in the vicinity of Cincinnati. Among the species which it is proposed to introduce is the European titmouse, considered abroad as one of the most successful foes of insects injurious to vegetation."—*'Nature,' August 14, 1873.*

[When may we hope to see the same enlightened views prevalent in Britain?—*Edward Newman.*]

Large Snake.—The 'Times of India' contains an account of the death of a huge boa constrictor which infested some marshy ground at the foot of the hills near Poodocottah. The animal was regarded as sacred by the natives, who would not molest it, although only on the morning when Dr. Johnston and Mr. Pennington, with great danger to themselves, bravely

hunted it up and shot it, it had swallowed a young child. The animal is about twenty-one feet long, and its stuffed skin is to be deposited in the Madras Museum.

Rare Fishes at Penzance.—I have to report the under-mentioned five rarities :—

The Blackfish (*Centrolophus Pompilus*).—Taken in Mount's Bay. I had the fish dressed by broiling. Its flesh was white, soft and flaky, and of a very delicate flavour.

The Solenette (*Monochirus linguatulus*).—I took this myself—or rather, a starfish took it, and I took the starfish holding the solenette in its feelers. It was a small well-marked specimen, three inches long.

The Braize or Beker (*Pagrus vulgaris*).—I took this in my nets. It was a small specimen, but is the first I have seen for several years.

Bloch's Gurnard (*Trigla Blochii*).—I took two specimens at Lamorna, in this bay, on long lines. I regard this fish not as rare in this neighbourhood, but as frequently confounded with red hellick.

The Torpedo (*Raia Torpedo*).—It was taken in a trawl on the bank between the Lizard and the Land's End. The fisherman who caught it did not know what it was, and did not become aware of its electrifying powers until he was in the act of cleaning it: on attempting to take out the gut he received a very unpleasant shock.—*Thomas Cornish; Penzance, August 8, 1873.*

Fox Shark off the Coast of Cornwall.—A few days since I was much interested in examining, in the flesh (or rather fish), a specimen of the fox shark or thrasher (*Carcharias vulpes*), which was captured about a fortnight ago at Mevagissey, Cornwall, and from thence forwarded to Plymouth, packed in salt, to be preserved for the Museum of the Plymouth Institution. It was a rather small specimen, about five feet six inches long, the upper lobe of the tail alone measuring half that length; but the most remarkable feature in connection with its capture, was that of its being caught with a hook and line, which so rarely happens on our coasts that Mr. Couch, in his 'History of the Fishes of the British Islands,' says that no instance of it has come within his knowledge, though sometimes taken in drift-nets. However, this example was really taken with a common whiting-hook baited with a piece of pilchard, at a depth of thirty-five fathoms, I was told; and when it was brought to the surface of the water it struggled and fought so gamely that it could not be hauled into the boat, and was allowed to rush away with the whole length of line, which somehow becoming coiled round its long tail, so hampered the fish that it was afterwards got into the boat without difficulty.—*John Gatcombe.*

Brighton Aquarium.—"Brighton still keeps far ahead of all rivalry in the size of its aquarium, and fairly deserves to be considered the leader of

the very commendable fashion that has set in. The public are becoming every day better acquainted with the peculiarities of the more recondite creatures who live where the purple mullet and the gold fish rove, and where the mermaid is decking her green hair with shells—creatures, many of them, which were not nearly so well known before this to most people as the mermaid herself.”—‘*Daily News*,’ August 18.

[This neat but comprehensive paragraph appears in a leader, not as an advertisement.—*E. N.*]

A Difficulty for Darwinists (see Zool. S. S. 3581 and 3654).—I have read the objections to my paper, quoted from ‘*Nature*,’ in your last number, and avail myself of your kind offer of space for replying to them. I quite agree with the writer of the criticism that the title, “A Difficulty for Darwinists,” was objectionable as being pretentious; the difficulty, however, was one which occurred to my own observation, and which has ever since remained as a *bonâ fide* difficulty to the acceptance of Darwin’s theory, in my own mind. I am quite willing to admit that I do not fully understand the subject. I do not pretend to anything more than a smattering of Zoology; still the remarks in ‘*Nature*’ do not seem to me a satisfactory solution of the matter; so far as I can understand them they are more like a cursory opinion, not meant for serious consideration, than really addressed to the difficulty. If I have not adverted in my paper to the possibility of such an answer being made it was because it hardly seemed necessary. The writer concedes to me that “it is theoretically possible for an infinite number of variations to occur in living bodies,” as if my argument had been all about abstract possibilities, and then takes up a position to show from actual fact what was probable and what was not. Now this is a position I cannot yield to him. I had already stated it as a *fact* that the forms and arrangements of teeth in vertebrates were practically infinite, and that the structure and development of teeth in the wombat, thylacine, dog and rodent respectively, were exceedingly complicated and high types of development, there being evidence to show that the steps in their evolution have been exceedingly numerous and gradual. It will not do for my criticiser to assume that I have only argued in an abstract way that “It is possible for an infinite number of variations to occur in living bodies.” If he wishes to attack this position of mine he must first show that my statement of fact is wrong, *i. e.* that there are but few forms and arrangements of teeth in nature, and that those of the wombat, thylacine, dog and rodent, are organs of low type and simple development. The writer goes on to say that marsupial and placental types of organism having had “to undergo the struggle for existence under similar circumstances, it is not to be wondered at, but only to be expected, that similar organisms should be the result.” Now I do not think any genuine Darwinist would accept this sentence as a sound

deduction, even if it were correct in the fact, which I maintain it is not, that the marsupial and placental types have had to struggle under similar circumstances. Mr. Darwin lays it down that the controlling forces which direct the path of variation in a species are the other species with which it has to struggle; and if these forces were sufficiently definite and restricted in their action to produce two such similar dental types as those of the thylacine and dog, independently of each other, it strikes me that classification of mammals would no longer be possible; should we not have dogs, cats, rodents and ruminants arising from independent sources all over the world? Darwin himself says ('Origin of Species,' chap. xiii. p. 413), "I believe that something more is included; and that propinquity of descent—the only known cause of the similarity of organic beings—is the bond, hidden as it is by various degrees of modification, which is partially revealed to us by our classifications." The writer sums up by saying that "it is just as probable, external circumstances being similar, that the isolated marsupial ancestor should give rise to carnivorous, rodent and herbivorous forms, as that they should have developed from a placental type." Does he mean that because one thing is as probable as another, that in any way explains why both things should have taken place? When the first discoverers of Pitcairn's Island were accosted by one of the natives asking them in broken English to throw him a rope, would he think it a good explanation of this fact to have it suggested to him that it was just as probable, external circumstances being similar, that such a simple form of speech should have been developed from the needs of isolated human nature on Pitcairn's Island as in England? I think his mind would hardly be satisfied by such an explanation.—*F. H. Balkwill.*

Lakes Albert and Tanganyika.—Sir Henry Rawlinson has received and published in the 'Times' a letter from Sir Samuel Baker, dated Khartoom, July 2, entirely confirming, as far as Sir Samuel's opinion may be trusted, the statement copied from the 'Telegraph' into the August 'Zoologist' (S. S. 3639). Sir Samuel expresses a hope that he will be in England in September. In reference to the oneness of Lakes Tanganyika and Albert Nyanza, he says:—"The envoys sent by M'tése all assured me that the Tanganyika is the M'wootan N'zizé (Albert Nyanza) and that Ujiji is on the eastern border; that you can travel by boat from Ujiji to the north end of the Albert Lake; but you must have a guide, as some portions are very narrow and intricate. From my experience of the high water-grass, I should expect islands and floating vegetation in the narrow passes described. I am by no means fond of geographical theories, but the natives' descriptions were so clear that I accepted as a fact that the Tanganyika and Albert Lakes are one sheet of water, with marshy narrow straits overgrown with water-grass, through which you require a guide." Sir Samuel's letter is of great length, and contains many details of his wars

and dealings with the natives of Central Africa, but nothing particularly interesting to the naturalist except the above extract, which it will be observed is in direct antagonism to what Mr. Stanley has published as to the survey of the northern extremity of Tanganyika.—*E. Newman.*

Death of Dr. Saxby.—Our readers will share the regret which we feel in recording the death of one of our best ornithologists, Dr. Henry Saxby, late of Balta Sound, whose communications to the 'Zoologist' have so often borne witness to his unwearied assiduity in the cause of Science. Owing to failing health, partly the result of prolonged suffering from a badly broken arm, his contributions to its pages had latterly become infrequent; but his note-books, written up to within three weeks of his death, which occurred at Inverary on the 4th of August, show to the last that minute vigilance and conscientiousness as an observer for which he was so remarkable throughout. A memorandum, which we have pleasure in issuing with the current number of the 'Zoologist,' will show that his long-announced book on the Birds of Shetland is soon to appear, the materials for the small portion not yet in order for the printer existing abundantly in his well-indexed journals. The testimony of competent judges who have examined the MSS., among them the Duke of Argyll, who has taken much interest in the work, is such as to warrant us in hoping for a valuable accession to our knowledge of the birds which visit the northern part of Great Britain, no fewer than fifty-seven species previously unrecorded having been added by the author to the Shetland list. In addition to the MSS. has been left a series of drawings of eggs of birds breeding in the islands, beautifully executed in water-colours, together with a very fine collection of skins and of eggs of assured British origin. Those who knew and loved our brother naturalist for his gentleness and kindly nature in private life will be well prepared to learn that he died in quiet faith, commending to God's care his widow and five little children, the youngest of whom was born but a few hours before his death. Dr. Saxby was only in the thirty-seventh year of his age, but for twenty-five years he had kept an almost daily register of the birds which came under his notice; and by residence in the south of England, in Belgium, and in North Wales, he had acquired a familiarity with the appearance and habits of arboreal and other land birds, which enabled him to identify them at a glance wherever they occurred.—*S. H. S.*

[I am indebted to an old and valued correspondent for a second obituary notice of my lamented contributor: it is written in the same kindly spirit as the above, bearing ample testimony to the merits of the deceased, but is not quite so complete in those details which it is desirable to preserve.—*Edward Newman.*]

Notices of New Books.

Official Handbook to the Marine Aquarium of the Crystal Palace Aquarium Company (Limited). By W. A. LLOYD, Superintendent of the Aquarium. Fifth Edition, revised and enlarged. 1873.

(Continued from S. S. 3676.)

Era II. LITERARY, POETIC AND FASHIONABLE.

In this second era or campaign, as I may call it, Mr. (now become Dr.) Bowerbank resigned the command, which, like Alexander's, was divided amongst four of his generals, Warrington, Gosse, Mitchell and Rymer Jones.

Mr. ROBERT WARRINGTON, of Apothecaries' Hall, not only devoted every spare moment of his life to experimenting on different forms of vessel, different arrangements of light, and different combinations of inhabitants, in order to ascertain the fittest, but he introduced a new element, substituting salt water for fresh, marine animals for fresh-water animals, sea-weeds for Valisneria. I was a constant visitor at Apothecaries' Hall, and found Mr. Warrington ever ready to exhibit and explain his experimental proceedings, for it must be admitted they were experimental; for unlike Mr. Bowerbank, who seems to have attained success at a single bound, Mr. Warrington had to think out his plans, and as his was altogether new ground, or rather new water, he was subject to repeated failures and disappointments, but eventually he triumphed over them all.

At our delightful reunions at Mr. Bowerbank's, first at Critchell-place and afterwards at Highbury, the lamented DAVID WILLIAM MITCHELL, then the energetic Secretary of the Zoological Society, who was ever on the alert for something to "draw," was a frequent visitor; the sticklebacks arrested and rivetted his attention, and he was not long in taking a lesson from Mr. Bowerbank's book: every one urged it; and Mr. Mitchell listened with marked attention, and conceived the project of an aquarium in the Regent's Park. With Mr. Mitchell there was seldom much time lost between the conception and the execution of a plan. In this instance these followed each other with unparalleled rapidity; he commenced building forthwith, ordered his tanks, and stocked them with their appropriate inhabitants, availing himself of every observation previously made either by Mr. Bowerbank or Mr. Warrington.

On Saturday, May 21st, 1853, as reported in the 'Athenæum' of May 28th, there was opened at the Zoological Gardens in Regent's Park a building or room for the express purpose of exhibiting living marine animals. This building, I believe, received at the hands of the Council the title of "Marine Vivarium," but this inflated appellation soon became toned down by the visitors to the more modest and less assuming one of "Fish House," which it has borne from that time to the present. I extract from the 'Athenæum' of Saturday, May 28, 1853, the following details, which will be interesting as a contemporaneous record of a notable event, and as inaugurating the second era in aquarian history. Moreover, it has the advantage of incorporating an account of the prior but more humble efforts, in the same direction, of Sir John Dalyell and Mr. Warrington, and this saves me the otherwise necessary labour of describing the very important result of the indefatigable exertions of these distinguished aquarians.

"Fresh-water fish were tried first in these gardens. Perch, pike, roach, dace, eels, sticklebacks and minnows were all to be watched, and their domestic secrets and most retired proceedings to be brought to light. The grand experiment, however, of making a little ocean, a miniature sea, in which we might look on the habits of the creatures of the great deep had yet to be made. Sir John Dalyell, it was well known, had kept a sea anemone alive for twenty-eight years, and numerous other marine creatures for less periods; but then throughout these twenty-eight years every morning he had had sea-water brought to his house. It seemed almost impossible to bring up sufficient quantities for such a purpose into our inland towns. Gradually it became known that by aerating the salt water by means of filtering or agitation it became fitted for the support of animal life. Here then a chance of success to an object long desired seemed to present itself, and the enterprising Secretary of the Zoological Society determined to make a trial on a small scale. He began with sea anemones and some of the more hardy shell-fish, and succeeded most satisfactorily. While, however, this experiment was in progress a fact of much greater importance became known. It had been observed by vegetable physiologists that plants purify a small quantity of water just as they purify the air,—that is, by taking up carbonic acid and giving out oxygen,—and here was the explanation of the fact of animals living for any length of time in a limited quantity of water, provided there were plants enough to take the carbonic acid which the animals threw off, and supply the oxygen which they needed. The question naturally arose, Why should not sea-weeds do the same for sea-water as fresh-water plants do for fresh water? Various dredgers and sea-shore

naturalists had successfully had recourse to this plan; but we believe the merit of first having perfectly succeeded with an arrangement of the kind in London is due to Mr. Warington. By arranging sea-plants and animals in a limited quantity of sea-water, he so maintained the balance of animal and vegetable life that for several months they required neither fresh water nor any mechanical aëration. It is the adoption of this plan on a large scale that constitutes the novelty of the Vivarium now opened to the public in the Zoological Gardens. At the present moment there are in the glass house six large tanks of glass containing marine invertebrate animals and fish. These tanks have been arranged in something like zoological order. The first contains a variety of crustaceans, crabs, lobsters and shrimps. Here may be seen in living activity species of these creatures only to be caught by the dredge, and which have been only occasionally seen when cast up on our coasts or pinned down in our museums; several of the spider crabs—which are inhabitants of the deep sea—will attract more attention among these specimens. In the second tank is a collection of Echinodermata. A third tank contains a collection of sea anemones or animal flowers. The more common forms of these lowest members of the great family of polypes are scarcely unknown to the least curious visitors of our sea-coasts, but it has fallen to the lot of few to see them to such advantage as they now may here. In variety of colour they almost vie with a bed of tulips, and they will enable the observer to understand something of the beauty which arrests the attention of the traveller in the South Seas, where these creatures and their allied forms abound. The naturalist will also find in this tank some of the less common of the species of the family Actiniadæ which are found on the British coasts. In a fourth tank is a collection of the British Mollusca. Those who gather shells by the sea-shore will recognise many of their old acquaintances in this department, but no longer as uninhabited dwellings. Each contains its proper tenant. Several species of ascidian Mollusca are found here, whose rough membranaceous and ungainly exterior would hardly lead to the conclusion that they are allied to shell-fish at all, did not their interior inhabitant reveal the fact. In another tank a highly interesting group of Mollusca, the nudibranchiate, are to be seen. These have no shells, and are remarkable for their delicate colouring, and for the curious forms assumed by their gills or breathing organs, which being placed outside of their bodies have got for them the name of naked-gilled. The species of this family belong to the genera *Doris* and *Eolis*. In the fourth tank are also contained some species of barnacles and sea-acorns (*Cirripedia*), which, with their hard molluscos-like shells, were once included under the Mollusca, but are now known to have an internal structure which allies them with the articulated tribes of animals: in this tank are some small species of sea-fish, including the blenny, the fifteen-spined stickleback, the wrasse and the

father-lasher (*Cottus bubalis*). The Annelides are represented in several of the tanks by species of Aphrodite and the beautiful Sabellæ. Many of the leaf-like and vegetable-looking objects at the bottom of the tanks are popularly called sea-weeds, and demand a microscope to make out clearly their animal nature. Nevertheless a sharp eye will detect a downiness on the surface of their bodies, which is the tentacle of the minute creatures that inhabit every portion of their structure, and are the representatives in our seas of those mighty workers, the coral animals of the southern ocean. The present collection is, we believe, only an earnest of future development. Some marine creatures, such as the jelly fishes, are not at present represented, but before the summer is over a collection of these fragile forms will undoubtedly find a place in the Marine Vivarium of the Society."

The aquarium immediately became a fashion, a rage, an infatuation, which, now that we are sobered down and are able to regard a stickleback with equanimity and a sea anemone without any sensible increase in the rapidity of pulsation, it seems difficult to realise. The press lent its powerful aid to this result. A judicious publisher is not he who invents, but he who avails himself of an invention: a man who embarks his capital in a 'Principia' or a 'Paradise Lost' will be esteemed a man of discernment by future generations, but will not be remunerated by the present. The successful journalist follows, while he is supposed to lead, public opinion; he deludes even himself with this gratifying but shallow fallacy. It was not until the parlour-pond had thoroughly established itself *as a fashion* that the press detected in it a source of profit. Book-makers and book-publishers then saw their opportunity, and were not slow to embrace it: the press teemed with aquariums. My friend Mr. Van Voorst took the lead in this movement, and amid the surging wave of aquarian literature, original and imitative, his volumes are still the best and most likely to endure. I will give the titles and dates of those aquarian volumes which appear to possess inherent excellence, interspersing those of a few tracts which, although of minor importance, assisted greatly in fanning into flame the fire that had already been kindled.

1850. On the Adjustment of the Relation between the Animal and Vegetable Kingdoms, by which the Vital Functions of both are Permanently Maintained. By Robert Warington. ('*Zoologist*' for 1850, p. 2868.)
1852. Observations on the Natural History of the Water Snail and Fish kept in a confined and limited portion of Water. By Robert Warington. ('*Zoologist*' for 1852, p. 3633.)

1853. On Preserving the Balance between the Animal and Vegetable Organisms in Sea Water. By Robert Warington. Read at the Hull Meeting of the British Association. (*Printed in the 'Annals and Magazine of Natural History' for November, 1853, and at p. 4118 of the 'Zoologist' for 1853.*)
1853. Aqua-vivarium. An article by Dr. Edwin Lankester. (*Printed in the Natural History Division of the 'English Encyclopedia.'*)
1853. A Naturalist's Rambles on the Devonshire Coast. By Philip Henry Gosse. 452 pp. letter-press and 28 plates, most of them coloured.
1854. The Aquarium; an Unveiling of the Wonders of the Deep Sea. By Philip Henry Gosse. 278 pp. letter-press, 6 coloured plates, and 6 engravings on wood.
1856. Tenby; a Sea-side Holiday. By Philip Henry Gosse. 400 pp. letter-press and 23 plates, most of them coloured.
1858. The Aquarian Naturalist; a Manual for the Sea-side. By Thomas Rymer Jones. 524 pp. letter-press and 8 coloured plates.
1860. Actinologia Britannica; a History of the British Sea Anemones and Corals. By Philip Henry Gosse. 362 pp. letter-press and 11 plates, 10 of them coloured.

These delightful works abounded with lucid descriptions, pleasing pictures, poetic quotations, and graphic accounts of the doings of aquatic animals as first seen by the assistance of the aquarium: nothing can exceed the beauty of some of the word-painting by PHILIP HENRY GOSSE; and as for THOMAS RYMER JONES, he is overflowing with poetry: no less than one hundred and sixty-two quotations, or as I may call them "snatches of song," are scattered through his "pleasant pages." He seems to have been so led away by his subject that he could not resist the impulse to break forth into melody.

A complete change had now taken place in the element as well as in the style of treating of it, the water employed for the experiments during the first era being almost invariably fresh, during the second period almost entirely salt: the object during the first era was almost entirely confined to the habits of the living tenants of the aquarium; during the second period, the fashion, admeasurements, size, materials, structure and ornamentation entered largely into aquarian literature; indeed these matters, utterly ignored by Bowerbank and his followers, became of paramount importance. Mr. Gosse says:—

"The tank is 2 feet long, $1\frac{1}{2}$ foot wide, $1\frac{1}{2}$ foot deep; the sides and the ends of $\frac{3}{16}$ th plate-glass; the bottom of slate, the corners of beech

wood, turned into pillars, each surmounted by a knob, and united by a frame top going all round. The glass is set in grooves in the slate and wood, and fastened with white-lead putty."—*'Aquarium,'* p. 101.

Mr. Warington, after experimenting unsuccessfully for some years, gave instruction for the making of a small tank as a more permanent reservoir, with certain improved modifications as regards form and the admission of light. He writes thus:—

"From the experience I had obtained in my experiments with the fresh-water tank, I was induced to modify slightly the construction of the vessel; thus at the back or part towards the light the framing was filled with slate, in the same way as the ends and bottom; for I had found that the glass originally employed very soon became covered with a confervoid growth which had an unpleasing appearance to the eye, and in consequence of which I have been obliged to paint the glass on the exterior to prevent the growth from increasing to too great an extent. It was almost an unnatural mode of illumination, as all the light should pass through the surface of the water. The front towards the room and the observer was constructed of plate-glass, the whole being set in a stout frame-work of zinc and cemented with what is known under the name of Scott's cement, and which I have found to answer for the purpose most admirably. Within the tank were arranged several large pieces of rockwork thrown into an arched form, and other fragments were cemented against the slate at the back and ends, and at parts along the water-line, so that the creatures could hide themselves at pleasure; a short beach of pebbles was also constructed in order that shallow water could be resorted to if desired; the whole tank was covered with a light glass shade to keep out the dust and retard evaporation."—*'Zoologist,'* 4119.

Professor Rymer Jones, modestly referring to Mr. Warington and Mr. Gosse as his authorities, recapitulates Mr. Warington's instruction, and points out its advantages:—

"*First*, that it allows of a most extended view of the whole interior of the aquarium.

"*Secondly*, that it enables the occupants to resort to any depth they may desire, or even to ascend the sloping back and emerge from the water.

"*Thirdly*, it admits of a much larger surface being exposed to the action of light; and

"*Fourthly*, the sloping top allows the water which condenses on the glass to trickle off and return to the aquarium without first resting on the zinc or iron frame-work. It need hardly be suggested that the sloping back is to be covered with light rockwork extending to a short distance above the water line."—*'The Aquarian Naturalist,'* p. 6.

Each of these various instructions, insisting on the exclusive use of putty, white lead, red lead, Scott's cement, &c., were severally regarded as embodying the perfection of human wisdom until the next adviser suggested an improvement; but notwithstanding this wide divergence on minor points, it is an important fact that all aquarian authorities seem to have deliberately considered and tested, and then uniformly rejected and condemned, all attempts at aëration or circulation.

Dr. Lankester avers that circulation is only needed as "precautionary" until the vegetation is quite established. Mr. Warington says, "With the sea-water obtained in January, 1852, I have been working without cessation up to the present time, agitating and aërating when it became foul during unsuccessful experiments on the sea-weeds, but since then it has rarely been disturbed," and then he emphatically adds, and I think it desirable to express his decision by italics:—"It must be decidedly understood that no agitation or so-called aëration is required when the balance of animal and vegetable life is properly established." This sentiment, perhaps somewhat less decidedly expressed, runs through all the aquarian books of this era: I wish, indeed, to show beyond the possibility of doubt, that the system of aëration and circulation belong to the third era, but it were of no avail to supplement the *flat* of the leader with the milder enunciations of the followers; it is like adding wine and water to wine.

It must not, however, be supposed for a single instant that the aquarian literature of the era is restricted to dry and useless advices or mistaken prohibitions: such a conclusion would be decidedly erroneous, utterly opposed to fact, and Mr. Gosse's work especially abounds in truthful descriptions of aquatic life which might fairly challenge a comparison with anything that has ever been written on the "manners and customs" of the World of Animals. I will make but one extract in proof of this, a long one indeed, but I cannot divide it without destroying its value, and as for making an abstract or abridgment, it is quite out of the question. The author's ideas might possibly be conveyed in an abstract, but the life, the soul of the passage would be wanting if I robbed it of the author's phraseology.

"*The Sepiola*.—My notions of the Cephalopoda, derived from figures of the various species in books, were anything but agreeable. I thought of them as hideous, repulsive, fierce, atrocious creatures, hated and feared

whenever seen. But an acquaintance with the pretty *Sepiola vulgaris* has not a little modified these ideas; and its beauty, sprightliness, and curious habits have made it quite a favourite pet among the denizens of my Aquarium. I take it in considerable numbers in this Bay, by means of the keel-drag already described, which rakes the bottom. It is a little creature, rarely exceeding an inch in length; though the extensibility of the arms somewhat varies its dimensions. When we turn out two or three from the net into a pail of sea water, they are at first restless and active. They shoot hither and thither, as if by a direct effort of will, but in reality by the impulse of rapid and forcible jets of water directed towards various points from the mouth of the flexible funnel situated beneath the body. After a few moments they suspend themselves in mid-water, hovering for many seconds in the same spot, scarcely moving a hair's breadth either way, but waving their large circular swimming-fins rapidly and regularly up and down, just like the wings of an insect. Indeed, the resemblance of the little Cephalopod, in these circumstances, to a brown moth hovering over a flower, is most close and striking, and cannot fail to suggest an interesting comparison. The body is held in a horizontal position, the large protuberant eyes gazing on either side; and the arms, grouped together into a thick bundle, hang freely downwards. If you essay to count these organs you find only eight; and even if you are aware that one of the characters of the genus is to have ten, of which two are much longer than the rest, you may search for these latter a long time in vain. Of course I mean during the life and the health of the animal, when its impatience of being handled presents obstacles to a very accurate investigation; you may then turn it over and over with a stick, and look at the bundle of arms from above and below in turn, now grouped together, and now thrown all abroad in anger at being teased; still you can make out but eight. It was not until after many trials that I at length caught a peep at the missing organs—the pair of long arms—and discovered that it is the animal's habit to carry them closely coiled up into little balls, and packed down upon the mouth at the bottom of the oral cavity. If we manage to insert the point of a pin in the coil, and stretch out the spiral filament, the little creature impatiently snatches it away and in a twinkling rolls it up again.

“A zealous votary of the circular system would seize on this analogy with the spirally folded tongue of a moth, and triumphantly adduce it as additional proof that the Cephalopoda represent, in the Mollusca circle, the Lepidoptera among insects. While thus hovering motionless in the water, the *Sepiola* presents a fair opportunity for observing its curious transitions of colour, which are great and sudden. We can scarcely assign any hue proper to it. Now it is nearly white or pellucid, with a faint band of brown specks along the back, through which the internal viscera glisten like silver. In an instant the specks become spots, that come and go, and change their

dimensions and their forms, and appear and disappear momentarily. The whole body,—arms, fins, and all,—the parts which before appeared free, display the spots which, when looked at attentively, are seen to play about in the most singular manner, having the appearance of a coloured fluid, injected with constantly varying force into cavities in the substance of the skin, of ever-changing dimensions. Now the spots become rings, like the markings of a panther's skin; and as the little creature moves slightly, either side beneath the fin is seen to glow with metallic lustre, like that of gold leaf seen through horn. Again the rings unite and coalesce, and form a beautiful netted pattern of brown, which colour increasing leaves the interspaces a series of white spots on the rich dark ground. These and other phases are every instant interchanging and passing suddenly and momentarily into each other with the utmost irregularity. But here is a change! One is hovering in quiescence, his colour pale, almost white; one of his fellows shoots along just over him; with the quickness of thought, the alarmed creature turns from white to an uniform deep brown, the rich full colour suffusing the skin in a second, like a blush on a young maiden's face. The hue is very beautiful; it is the fine, deep, sienna-tint of tortoise-shell; a substance which, indeed, the mingling clouds of brown and pellucid horn closely resemble in the intermediate phases of colour. Hitherto we have seen the *Sepiola* only in the pail of water into which it was turned out of the net. After a little while it drops upon the bottom, and crouching up remains motionless; if you rouse it, it will again swim for a few minutes, but presently seeks some corner, into which it thrusts its rear, and huddles up as before. This is all that you will see of its habits under such circumstances; for in all probability the morning will reveal your *protégé* a lump of white jelly, dead and stiff, with uncoiled arms, on the naked floor of his prison. But introduce him while in health into an Aquarium, where living sea-plants are perpetually revivifying the water, and where the bottom, varied with sand, gravel, and pieces of rock, imitates the natural floor of the sea, and you will soon see other particulars in the economy of our little friend, which will, I doubt not, charm you as much as they have pleased me. The *Sepiola* is a burrower; and very cleverly and ingeniously does it perform a task which we might at first suppose a somewhat awkward one—the insertion of its round corpulent body into the sand or gravel. Watch it as it approaches the bottom, after a season of hovering play such as I have described. It drops down to within an inch of the sand, then hangs suspended, as if surveying the ground for a suitable bed. Presently it selects a spot; the first indication of its choice being that a hollow about the size of a silver fourpence is forcibly blown out of the sand immediately beneath the group of pendant arms. Into the cavity so made the little animal drops; at that instant the sand is blown out on all sides from beneath the body backward, and the abdomen is thrust downward before

the cloud of sand which has been blown up settles, but which presently falls around and upon the body. Another forcible puff in front, one on each side, and another behind, follow in quick succession, the fine sand displaced at each blast settling round the animal, as it thrusts itself into the hollow thus more and more deepened. I was not at first quite sure by what agency these blowings, so admirably effective and suited to the purpose, were performed. The jet in front I readily attributed to the action of the fleshy funnel projecting from beneath the mantle on the breast: but I did not see how this could blow a stream directly backwards. I therefore put one of my pets into a vessel with glass sides, which was furnished with the requisite sand and water. I at once saw that the funnel was indeed the organ employed, and the only one, in every case; and perceived its beautiful adaptation for the work it had to do, in its extreme flexibility. This organ is very protrusile, and being perfectly flexible, its orifice can be, and is, at will pointed in any direction, so as to blow the jet of water forward, backward, or to either side at pleasure. It frequently occurs, of course, that small stones are mingled with the sand, or the animal may find it convenient to burrow in the loose gravel. In either case the arms come to the aid of the funnel, the sucking disks with which they are furnished being made to adhere to the stones, which are dragged out and thrown aside. You may suppose this to be a clumsy expedient, but you would think differently if you saw it; the rapidity with which the arms are thrust under, and drawn out, bearing pieces of stone of comparatively large size, and the graceful ease with which they are then thrown forward, discharging and dropping the burden, impress the mind with admiration of the beautiful fitness of the organization for the requirement. This use of the funnel, and of the sucking arms, so different from their normal purposes, affords additional examples of that Divine economy in creation, which, when a new formation is ordained, does not always form new and special organs for the necessity, but adapts some already employed in other service for the new work; while still both the one and the other function are fulfilled with such perfection as shows that every emergency was foreseen and provided for in the mighty plan, and that it was not for want of resources that distinct actions are performed by the same instrumentality. We admire the skill of the artizan who can effect different operations with the same tool, especially when we see that each kind of work is of faultless excellence. The ordinary employment of the sucking arms is no doubt the same as in other Cephalopoda, the capture and retention of prey. Of this I saw an instance in the case of one of my *Sepiolæ* which had seized a shrimp (*Crangon trispinosus*), a sand-burrower like itself, and was, when I saw it, holding it firmly against the horny jaws, which were devouring it. The discharge of ink through the funnel I have also witnessed, though this is far from being a frequent action with this species. One of them that had been for a day or two in an

Aquarium, and was evidently at home there, I put into another vessel. No other animal was present, but the strangeness of the new abode evidently frightened it; it darted about in manifest alarm and excitement, and presently shot forth from its funnel a cloud of inky fluid to a distance of several inches; another and another discharge succeeded in rapid sequence, and it was not for some time that the animal recovered its equanimity. It did not appear to me that this fluid could be of much service to the little creature in the way of concealment; for although the matter was tolerably copious, and densely black, it did not diffuse itself in the water, but remained in masses, and when moved with a stick was drawn into slimy strings."

Here ends the second era in the history of the aquarium, and although we are indebted so greatly to the leaders of this period for their patient research and indomitable perseverance, it cannot truthfully be denied that a large share of these qualities was wasted on useless instructions about selecting and cultivating sea-weeds; in cruel and mistaken advice to keep the captives without food; and in denouncing the very principle, that of aëration and circulation, by which alone the aquarium can become permanent.

EDWARD NEWMAN.

(To be continued.)

Ornithological Notes from Norfolk. By H. STEVENSON, F.L.S.

(Continued from Zool. S. S. 3561.)

APRIL, 1873.

Spring Migrants.—The following dates of arrival of spring visitants have been chiefly supplied me by Mr. J. H. Gurney, sen., from his own observations, or with some other authorities in different parts of the county:—Chiffchaff, March 27th, Northrepps. Wry-neck, March 31st, Surlingham; April 6th, Keswick; 12th, Northrepps. Blackcap, April 5th, Northrepps. Redstart, April 7th, Earlbam. Swallow, April 14th, Elmham. Sand Martin, April 4th, Surlingham; 15th, Stoke. Sedge Warbler, March 30th, Surlingham. Lesser Whitethroat, April 16th, Keswick. Young song thrushes able to fly, April 16th, Northrepps; young blackbirds, April 20th, Norwich. Nightingale, April 17th, Northrepps. Cuckoo, April 22nd, Northrepps. A considerable flock of fieldfares was seen at Northrepps on the 20th of April.

Guillemot.—A bird killed about the 20th of March had acquired its full summer plumage.

Hawfinch.—A single bird and a pair seen early this month at Thorpe, near Norwich, no doubt remaining to breed.

Great Crested Grebe.—Owing to timely protection I have a good account of this species on most of our large broads, but unfortunately they return to those waters too soon to come at once under the protection of the Act.

Ring Ouzel.—One shot at St. Faith's, near Norwich, on the 1st.

Sea Eagle.—A fine young male of this species was shot at Stokesby, near Yarmouth, on the 22nd, having been seen for some days in that neighbourhood. The bird was brought to me in the flesh, and though very fat, I found only a few small fish-bones, a little fibrous grass, and fragments of dry reed in the stomach.

Nocturnal Migrants.—Professor Newton informs me that on the 18th, between twelve and one o'clock in the morning, he heard birds passing over the town of Cambridge, apparently of but one species, although he was unable to recognise the note satisfactorily: they continued passing for about ten minutes. I observed the same thing at Norwich on the night of the 20th, but not later than ten o'clock.

Woodcock.—A perfectly white woodcock is said to have been seen at Corton, near Lowestoft, about the 20th of this month. A nest with four eggs, with the bird sitting upon them, was found this month in a plantation at West Tofts, and other birds have been seen.

MAY, 1873.

Whitewinged Black Terns.—Of this species, no longer a rarity, at least in this county, five specimens were killed out of a flock of seven, at Hickling, near Yarmouth, on the 30th, and seven more are said to have been seen.

Spoonbill.—One shot on Breydon about the middle of this month.

JUNE, 1873.

White Stork.—A fine bird was shot at Potter-Heigham, near Yarmouth, on the 5th, no doubt the same recorded in the 'Field,' about that time, as observed in the adjoining county.

Blackbird.—Second nest of young birds hatched on the 3rd.

Spoonbill.—Three killed at one shot on Breydon on the 9th, and a fourth, about the same time, in the same locality. Of the first three, two had slight crests and full-sized bills, the other no crest

and a bill only seven inches long; this was a female, but all the others were males. The single bird had a full crest, but none exhibited any yellow colour on the breast.

Woodcock.—A small red woodcock was caught in a garden at Yarmouth on the 14th, and proved a female on dissection. The bird was very bare of feathers on the thighs and under parts, but showed no other indications of having been nesting; internally it seemed to be out of condition.

Kingfisher's Nest.—On the 6th of this month, when the young birds were able to fly, I examined a nest of this species, perforated into the face of a large chalk pit, about two feet six inches from the top of the jamb, and partly concealed by the overhanging grassy summit. This pit is in the parish of Keswick, near Norwich, and some two hundred yards from any stream. It is in the same neighbourhood as the nest I examined some few years back, which was situated in the bank of a meadow-drain. The present nest contained six full-fledged young, with the feathers on the top of their heads much matted with the soil, which had dried on. The chamber itself was domed, four inches deep by six inches wide, and just the height of the nestlings, and from the mouth of the hole to the back of the nest was nearly twelve inches. On the floor were a very few fish-bones, but no other lining of any description, which confirms my impression that in new nests the eggs are laid on the bare soil, and the fish-bones accumulate gradually by the castings of the young. I have no doubt the previous nest I examined had been used for several seasons, as perfect walls of dried fishy matter had formed round it, and still more recent deposits were heaving with maggots. In this case, except close to the entrance, the nest was perfectly sweet and the fish-bones white and dry. The entrance-hole measured three inches by two inches in width. I have no question that this nest was made by the birds themselves, and not adapted from a sand martin's or other boring. Many small fish which had been dropped by the birds were lying at the bottom of the pit, and it is believed that for two or three seasons the same pair have nested lower down, at the extremity of an old rabbit-burrow.

JULY, 1873.

Swallow's Nest.—Found a nest of this species, on the 16th, attached to the side of a rafter in a boat-house, the birds gaining

an entrance only between the bottom of the door and the water. The nest, as usual, built of clay and lined with feathers, had a large mass of grass-stems hanging over the front, making it look like a sparrow's winter haunt. The eggs were hard set upon.

Swift.—Unusually numerous this summer in and around Norwich: I never remember to have seen so many in this neighbourhood as during the intensely hot weather that prevailed in the middle of this month, which these birds seemed to revel in, in the hottest hours of the day.

White Starling.—A pure white starling was shown me by a birdcatcher, which he had netted with others in the course of this month.

Carnivorous Taste in a Rook.—That rooks destroy the eggs of game, particularly in dry seasons, there is no question, and their very near relationship to the carrion crow is as strongly marked, at times, by carnivorous propensities. Mr. Gurney has informed me of the following case in point, which occurred on the 7th of this month at Northrepps. The head keeper, when visiting his coops in the middle of the day, to feed the young pheasants, observed a rook rise from one of the coops, but paid no attention to the circumstance at the time. On returning with a supply of water in about half an hour he found a young pheasant, quite dead but warm, on the spot where the rook had been, and having set a trap, baited with a portion of the bird, in less than an hour he found a rook dead in the trap. Mr. Gurney examined this bird, which was a young one of this season, in good condition, and in its stomach found portions of the young pheasant. How the latter was killed it is difficult to say, as it was a fine three-quarter grown bird, healthy and strong.

Green Sandpiper.—Mr. Gurney informs me that owing to the decoy-pond at Hempstead, near Holt, having been cleared out recently, and the mud thrown on to the banks, this species has been attracted to the spot in unusual numbers. A few had been seen there by the keeper early in the month, but on the evening of the 24th no less than ten were seen by Mr. Gurney himself, which rose wildly, some singly, others in twos and threes; but they soon returned to the same locality from whence they had been flushed. Mr. Lubbock, in his 'Fauna of Norfolk,' records a similar abundance of this species, many years back, at Norton, in Suffolk, where a range of meadow-drains had been "fyed" out in like manner,

and remarks, "The black soil of ditches appears an irresistible temptation to it."

AUGUST, 1873.

Green Sandpiper.—An adult bird was shot on the 20th, at the margin of a pond at Northrepps; and on the 25th I saw three flying together on the banks of the Yare, near Cantley. Two or three specimens have been also brought to our Norwich bird-stuffers.

Greenshank.—A bird of this species was shot at the same pond as the last-mentioned bird on the 21st; it proved to be a bird of the year.

Nocturnal Migrants.—The call-notes of birds over the city have been heard on many nights during this month, more particularly preceding the thunder and vivid lightning which has occurred on several successive evenings, between the hours of nine and twelve. On the 15th and 17th the passage of migrants was noticed after dark by many individuals. On the night of the 24th, at eleven o'clock, very dark, with summer lightning all the evening, I heard redshanks whistling overhead, passing apparently in small groups, but proceeding due north and south. The same thing occurred the next night about nine o'clock, preceding a sharp thunder-storm. Stragglers of other species, whose cries were difficult to recognise, passed at the same time over my garden—one, an undoubted ringed plover, if one might judge by its clamour, flying singly. The redshank's whistle, as the chief harmony, has been unmistakable this autumn, but, strange to say, I have heard no golden plover, which usually form the bulk of our whistling night birds.

Swift and House Martin.—The large number of swifts seen for many weeks over my garden had nearly all disappeared prior to the 24th of this month, and on the 31st I observed only two pairs amongst many house martins. Of the latter a large number congregated on the slates of a house next to mine on the 31st, but these disappeared about mid-day, and I have seen only a few stragglers since near this part of the city. During the intensely hot weather the house martins, in the hottest glare of the sunshine, ascended into the deep blue vault of heaven, and there performed a mazy dance, accompanied by loud twittering notes, which alone directed the eye to their whereabouts when "scarce so gross as beetles." This I have observed on many occasions, but I think generally

during a prevalence of great heat. If swallows and their kindred fly low, with impending showers, for their insect prey, do they ascend in pursuit of the same during scorching heat?

Little Gull.—A very young bird, judging by the dark markings on the head, back and wings, was shot near Yarmouth, about the 25th.

Temminck's Stint.—Mr. Gurney informs me that a specimen of this stint, a young male of the year, was shot at Hickling on the 29th, where another (two seen at that time) had been killed about a week previously.

Terns.—Both at Yarmouth and Lowestoft a considerable number of these birds, chiefly common terns, have been seen fishing off the coast; but several specimens of the arctic tern have been sent to Norwich for preservation lately.

Razorbill and Guillemot.—Said to be very plentiful in the "Roads" this autumn off the Yarmouth coast. At Lowestoft I saw lately two guillemots, plucked and dressed like chickens, at a poulterer's shop. I wonder what name they would be sold by if to other than fishermen's wives?

Sparrowhawk.—Early in the morning of the 31st a young male of this species was caught inside a covered fowls' yard at Northrepps Hall, near Cromer, having, as supposed, dashed itself through the top netting. The fowls were shut up, and it is probable, therefore, that two pigeons roosting in the covered yard were the objects of his attack, though he seems to have been too much bewildered when inside to make any hostile demonstrations.

HENRY STEVENSON.

Norwich, September, 1873.

Ornithological Notes from Devonshire and Cornwall.

By JQHN GATCOMBE, Esq.

(Continued from S. S. 3632).

JULY, 1873.

2nd. There are many young wheatears on the banks of the Laira.

4th. Again visited Wembury Cliffs, and found that some of the young herring gulls were almost able to fly, although others showed a considerable amount of down among their feathers, especially about the head; in some places there were three young birds

together, and in others only one. Cormorants were plentiful on the rocks below, and a quantity of martins were flying in front of the high cliffs, on the faces of which no doubt they had their nests. Common buntings, too, were plentiful on the walls and bushes in the fields above.

6th. Watched several families of starlings in grass fields, the old ones in constant attendance on, and feeding, their young, notwithstanding they appeared well able to provide for themselves.

7th. There were large flocks of herring gulls in the Sound; and I am sorry to add that many have been lately killed and taken to the birdstuffers, notwithstanding the Sea Birds Act.

10th. Walked along the coast beyond Bovisand, some miles from Plymouth, and was surprised to find a family of six common sandpipers on the rocks, which had already left their breeding-place on the moor. I do not remember having before seen these birds so early on the sea coast after the nesting season.

14th. Went to the valley of the river Tamar, near Launceston, and observed many gray wagtails on the rocks and stones by the side of the stream, feeding their young, although the youngsters seemed pretty expert in catching insects for themselves. Common sandpipers are now becoming rather numerous on the banks of our estuaries, and will soon distribute themselves freely along the sea coast preparatory to their departure for the winter. Within the last few weeks many kingfishers, young and old, have been killed and brought to the birdstuffers.

16th. My friend Mr. Bignell, of Stonehouse, told me that he had seen a family of six Cornish choughs at the Bolt Head, near Salcombe, on the Devonshire coast; and the same gentleman having observed a pair of these birds a month or two before at the same place, I have no doubt that they bred and brought out four young ones, which would account for the family of six seen on the second occasion. Bolt Head is, I think, quite a new locality for the Cornish chough.

21st. Saw an adult specimen of the Norfolk plover running about in a garden at Stonehouse, and was informed that it had been shot at and wounded slightly in the wing some three or four months before, near Liskeard, in Cornwall: I mention this as the species is so rarely met with in Devon or Cornwall. A redbacked shrike was caught with bird-lime and brought to Mr. Rogers, of Plymouth, who deals in live birds; and some years since he had a

woodchat shrike brought to him, caught by a birdcatcher, but in that instance the shrike dashed down at a "call-bird," and was captured in the net.

AUGUST, 1873.

1st. Starlings, both young and old, assembled in large flocks to roost in some shrubs and trees at Stonehouse this evening.

4th. Visited the river Tavy on a fishing excursion, and found swifts very plentiful in the vicinity.

5th. A large number of herring gulls in the Sound, both young and old, the latter in severe moult, looking very ragged, which has been the case for some time past.

8th. Saw two more young redbacked shrikes, which had been caught with bird-lime, kept in a cage, and fed with meal-worms, small birds and raw meat. Mr. Rogers told me that they actually ate several ripe gooseberries which he threw into the cage.

11th. A great many curlews, ring dotterel and dunlins on the mud-banks of our rivers. From this date until the 16th swifts plentiful in the neighbourhood of Plymouth, chasing each other and screaming in the early morning and evening. Sparrows are now assembling in vast flocks in the stubble-fields. This afternoon I saw a family of redbacked shrikes on a hedgerow, the old birds at times feeding the young ones. Lesser blackbacked gulls have now returned to our harbours, but I cannot find out where they have nested on this part of the coast.

18th. Observed a flock of linnets, some of the old males among which had still magnificent rose breasts, as bright as in spring.

24th. Remarked the first kingfisher among the rocks on the sea coast, where they make their appearance every autumn, but not generally so early.

25th. Observed my last swift, but a friend tells me that he thought he saw one a few days later. We have been having some severe gales lately, and it was blowing very hard when I saw the swift. I read in the 'Field' newspaper accounts of large flocks of swifts having been observed flying west over London and Brighton in June last, which may perhaps in some measure account for their being so plentiful with us in Devon and Cornwall this summer. A few weeks since I had a beautiful young swift brought to me which had been picked up from the ground stunned, having no doubt flown against something: it was kept in a cage all night,

but the next day, on giving it its liberty, I was rejoiced to see it fly away, apparently as well and strong as if nothing had happened. I think the young swift of the year is handsomer than the adult one, so many of its feathers being delicately edged with a narrow line of buffy white. Observed some young oystercatchers on the coast to-day, and am glad to find young herons plentiful on the mud-banks. Robins have now returned to our gardens in the town, and are already uttering their plaintive autumnal song.

26th. Visited Torquay, where I remarked the first blackheaded gull on the coast since the breeding season; it was, I think, an adult, which had entirely lost the black hood of summer. The weather was very boisterous at the time, blowing a very stiff gale, and on a rock a short distance from the shore, called the Shag Rock, I saw no less than thirty or forty cormorants, all crouched in a horizontal position, with their necks drawn back on their shoulders, facing the gale, producing altogether a very strange effect, considering these birds generally stand so erect.

27th. Young gulls are now very plentiful in our harbour, and I am sorry to add that one man shot eleven the other morning from the rocks as they flew by, the prevailing gales bringing them so close to the shore.

28th. Saw the first tern on the coast: this is rather early, as it is rarely seen here until September, and generally after a gale. Wheatears are very numerous on the coast just now, which is usually the case before their departure for the winter.

30th. Again rambled along the coast beyond Bovisand, and observed a single young redbacked shrike on the edge of the cliff skirting the coast. Redbacked shrikes have been more plentiful in our neighbourhood this season than I have known them to be for some years past. I was much amused at seeing a young herring gull make constant dashes at a cormorant in the water, which had a large fish in its mouth, much too large to be swallowed easily. Directly the gull made a dash, down would go the cormorant, and the moment it reappeared the gull would renew the attack, until at last, after the most violent efforts on the part of the cormorant, the fish disappeared in its capacious maw. In the evening I found the great bunting numerous among the furze-bushes on the cliffs, where no doubt they had come to roost; but, strange to say, I did not see a single rock pipit during the day, although in another month that species will be abundant all along

the coast. Swallows and martins have not yet diminished in number, but the former are congregating every morning on the telegraph-wires. Martins are in many places still feeding their young. Should these gales continue I shall expect to see phalaropes in a few days. I have just examined a fine old hobby which had been knocked down by a young man with a stone: having lost several young ducks lately, and thinking a hawk to be the thief, he watched, and had not watched long before he saw the hobby perch on an apple tree close by, upon which he took up a stone and knocked it down, breaking its wing by the blow; then, after keeping the poor bird alive for a few days, he carried it to a birdstuffer, who killed and stuffed it; but I could find nothing in its stomach save the remains of the common dung beetle.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth,
September 5, 1873.

On the Migration and Habits of the Curlew Sandpiper (Tringa subarquata, Gldenstaedt). By JOHN CORDEAUX, Esq.

AT the end of the last week in August and early in September there was an extraordinary migratory arrival of curlew sandpipers in the Great Cotes marshes.

On the 31st of August I was crossing a very bare sheep-walk, about a mile from the shore, when I came upon a flock of small waders sitting breast to the wind, and very much resembling little lumps of chalk scattered over the short green herbage. I supposed them either dunlins or ringed plovers, hundreds of which at this season frequent these marshes; but on bringing my binocular to bear it became at once apparent that they were neither of these: from the peculiar tint of the under parts they might, however, have passed muster for young knots in the plumage of the first autumn, but if so they were the smallest knots I had ever seen. A nearer acquaintance therefore became absolutely necessary before I could determine the species, and I had no gun. A slight hollow, where an old top grip had been filled in, favoured an approach, and up this I wriggled for some distance, and then slowly bringing my eyes level with the surface, found I was within twenty yards; one look through the glass at this distance was sufficient to show they were curlew sandpipers. There were sixty or seventy, somewhat

scattered at first; but suspecting something was wrong, they ran together in a cluster, and stood looking towards my hiding-place: a well-directed shot at this range would have half exterminated them.

They appeared birds of the year, having the same buff-coloured wash on the lower neck and breast which we find in the young knot. There was a rather conspicuous lightish streak over the eye; the bill was long and decurved at the end, but not more so than in the dunlin; they stood, however, higher, and looked a larger bird than this species. Some on the outside kept rising and flying over the heads of those in the rear, showing at the same time their most characteristic distinctive mark, the white upper tail-coverts.

In their habits they more nearly resemble the reeve than the dunlin: they run rapidly with the tibio-tarsal joints much bent, and they have the same habit which we see in the reeve of raising themselves, stretching their necks, and peering about when they suspect danger. Their flight also is very reeve-like, their long pointed wings increasing the resemblance. They fly in a lump or cluster, close together, sometimes rising to a considerable height, and then again sweeping or skimming the ground, wheeling rapidly round the pasture and dashing up to windward, they will alight suddenly and commence feeding.

Later in the day I returned to this field with my gun, but did not get a shot: they had then got mixed up with a flock of peewits, rising and going off to the coast together.

September 1st. Again on the look out for the curlew sandpipers, but did not find them in this field. In a marsh about half a mile further inland there were about fifteen or twenty in company with peewits, and feeding with them. I got a long shot at three, dropping one; the survivors, instead of making off, continued to fly round and hover (winnowing the air like kestrels) above their wounded mate, and uttering the most piteous little bird-wail I ever heard. It was wonderful to see such an exhibition of feeling and sympathy on the part of these little creatures. In an adjoining field, a very bare summer-eaten clover, there were many more foraging in company with curlews and peewits; these latter rose, leading the sandpipers with them. There were probably from one hundred to a hundred and fifty; these collected into two flocks, flying round in a wide circle, and did not offer a shot.

Their call is peculiar; it is not a whistle, but a "chirrup," and may not inaptly be rendered by this word. When the flock are in full chorus, which is generally the case when they are on the wing, the effect is exceedingly musical and pleasing: it is not unlike the twittering of snow buntings, and most opposite to the sharp distinct call of the dunlin.

I saw several other small parties during the next two hours, and later two flocks in a thirty-five acre pasture near my marsh farmstead—probably about seventy in one, fifty in the other. I killed four out of these, some of the survivors, as in the previous instance, hovering for a short time over the dead birds, uttering the same pitiful wailing note.

These flocks all occurred within a comparatively circumscribed area, and I can speak positively as to their having been composed exclusively of curlew sandpipers. I saw, however, during the day many very extensive gatherings of similar appearance careering above the marshes at great distances, much too far indeed for identification, yet judging from what I had seen on my own land, I feel tolerably confident that they also were curlew sandpipers, and probably all of them migratory flocks. On the following day, as far as I could judge, they had entirely left the district, and I have only seen half a dozen since.

In the specimens procured, the bill and claws are black; the legs, tarsi and feet very dark green—the colour known as "invisible green;" iris dark brown. The stomachs of three examined were filled entirely with insect remains,—Coleoptera, Diptera, and their larvæ,—also several sharp angular fragments of quartz, not picked up in this district.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire.

Bottlenosed Whales off Penzance.—Five large cetaceans, which, from what I saw of them (*viz.* the back fin and part of the back adjacent to it), I believe to be bottlenosed whales, or "blowers," passed my boat about two miles off the shore here, on Wednesday evening, the 20th of August. Three were much larger than the other two.—*Thomas Cornish; Penzance, August 22, 1873.*

A few Last Words on the Cuckoo Question. By the Rev. ALFRED CHARLES SMITH, M.A.

[I intended, and almost promised, to exclude all communications on this subject unless consisting "wholly or chiefly of facts;" but Mr. Smith, the originator of this discussion, in this his final paper, has given so fair, and so inoffensive, a review of the whole matter, and the hypothesis which he now introduces to our notice is so ingenious, and is stated with so much modesty, that I cannot hesitate about departing in this one instance from a resolution made perhaps somewhat too hastily.—*Edward Newman.*]

As I had the honour of introducing the question of the colouring of cuckoo's eggs in the pages of the 'Zoologist' in 1868, and again in the spring of this year, perhaps I may be allowed to reply to the various expressions of opinion called forth in its pages; or rather, may be permitted to examine the conclusions to be derived from these opinions, which I will try to do as fairly and impartially as I can.

(1) I think I may assume that the balance of opinion favours the theory that the eggs of the cuckoo *do* vary in colour to a considerable extent. I hasten to add that there are some, and good ornithologists too, who deny this, and who even declare that the eggs of the cuckoo are of peculiarly unvarying colour; but it will not be disputed that those who so think, or at all events who have so declared their opinion, are in a very small minority.

(2) In the next place I venture to say that it has been pretty generally allowed that the eggs of the cuckoo strangely resemble the eggs of other birds, especially those among which the egg of the cuckoo is frequently found. In the view of the German ornithologists, so often quoted in previous papers, this is thought to be the *rule*, though that view is qualified by the addition that "to this rule there are very many *exceptions*." In the opinions of most of our English ornithologists, however, it seems to be considered that the *rule* is in favour of the colour generally (perhaps conventionally) assigned by common consent to the cuckoo's egg; and the *exceptions* (also allowed to be numerous) when the egg of that bird resembles those of the species in whose nest it is laid.

On these two points most of those who have examined the question are, I think, agreed; but beyond this, opinions differ

widely; and when we come to discuss the probable *reasons* for such variation in colour, and assimilation of colour to the eggs of the selected foster-parents, there are almost as many theories as disputants. The German writers, indeed, appear to be unanimous in ascribing this peculiarity to the provision of Nature that "the cuckoo's egg, coloured and marked in a very considerable degree like the eggs of those birds in whose nests they are about to be laid, might the less easily be recognised by the foster-parents as substituted ones." ('Zoologist' for 1868, p. 1157.) But this explanation does not seem to be accepted in England, where it has been more than once pointed out that such a provision is wholly unnecessary, inasmuch as the foster-parent willingly accepts the intruded egg, whether with or without such resemblance to its own in colour. The cause above assigned therefore does not seem to our ornithologists to be adequate, and so a variety of conjectures has been hazarded, and a multitude of reasons suggested, but none of them to my judgment in any degree convincing, or indeed so plausible, as the original motive assigned by Dr. Baldamus and his followers.

And yet, could we but discover it, there must be *some* sufficient cause for so peculiar a habit. I hardly like to hazard a conjecture, which may in all probability turn out to be a mere fancy; but it has occurred to my mind many times of late whether it is possible that the young cuckoo can by any means derive from its foster-parent so much of that nurse's nature (whether by the diet on which it has been brought up, on which exclusively the young of the foster-parent would, had they survived, have been fed or otherwise), as when its own turn for breeding arrived, to affect (though unconsciously to itself) the colouring of the eggs it laid. I do not offer this as a solution of our difficulty: I merely throw it out as a hint or a fancy which has suggested itself to my thoughts; but before it is rejected as far-fetched and ridiculous, let me submit these few considerations to those who care to pursue the enquiry.

First, however, I would mention in passing, as worthy of observation, that the young cuckoo has been oftentimes declared to have acquired the exact *note* of its foster-parents. Of this Mr. Thompson gives decisive evidence in the case of a young cuckoo which was taken out of a titlark's nest, and of which he says, "for several weeks after the cuckoo was placed in confinement it uttered, when in want of food, a note so closely resembling that of the titlark

that it would have been almost impossible to distinguish between them.”* It is true this may be mere mimicry, or the result of imitation; but it must be remembered that in calling for food, the young cuckoo can only imitate the note of its foster-parents, its foster-brethren having perished on its account in their infancy. Here then we have the young cuckoo in one important respect partaking of the nature of its foster-parents. I do not, however, wish to push this point too far, or to lay greater stress upon it than it deserves. Let it be taken for what it is worth, though I think it deserves consideration in connection with the subject before us.

And now, in support of my fancy, I first unhesitatingly assert that the cuckoo, about to lay her egg, has no more notion of its colour than any other bird has. The *will* of the parent has nothing whatever to do with it. I am too ignorant of the process by which the pigment or colouring matter is diffused over the egg, or of the exact moment when it receives that pigment before leaving the oviduct, to be able to show by conclusive reasoning that birds, of whatever species, are wholly passive and unconscious, while the colouring of their eggs is going on; but I venture to assert, without much fear of opposition, that such is the case with all birds, and with the cuckoo not less than with other species.

What it is that influences the colouring matter, and produces a blue egg for one species, a brown egg for another, and a reddish egg for a third, I can no more describe than I can account for the varying colours in plumage in the respective species of birds. Whether the colouring process in regard to the *egg* is influenced in any degree by the kinds of food the bird eats, I do not know; though that food *has* an effect on the colour of the *plumage* of birds I do know; of this the familiar case of the bullfinch becoming black if fed on hemp-seed, is a well-known and sufficient example.

Next, I submit that in all probability the young of the several species of even our insect-eating warblers are not fed on precisely the same diet. This in many cases is obvious; because whereas one species procures its insect-food near the banks of streams or ponds, another in our meadows and gardens, and another in the hedgerows and ditches, these must undoubtedly feed their young on the insects which abound in the districts they severally frequent. Then I think it is not improbable that the same rule holds good in

* ‘Natural History of Ireland,’ vol. i. p. 360.

regard to *all* species of birds. I mean that the hedge accentor will feed its young with one kind of food, the robin with another, and the wagtail with a third, and so on throughout the list of foster-parents to which the cuckoo entrusts her progeny. If this be conceded, and if it be considered possible that diet may affect the colouring matter of the eggs, we are advanced some way on the road towards allowing the plausibility of my fancy.

But I would now observe that if any hen bird of any species arrived at maturity be dissected and examined, it will be found that her ovary will contain the germs of all the eggs she will ever lay during her life-time. It is not impossible, then, that if influenced at all by the nutriment on which she was brought up, she may be *permanently* influenced, in regard to the colouring of all the eggs she will lay. Not to mention that it is far from unlikely that a cuckoo, hatched by a hedgesparrow or wagtail, might ever after affect the diet to which it was first accustomed, just as an Eton Colleger returns in after life with extreme relish to the roast mutton which formed his daily dinner at school.

It is true that in this theory I have no precedent or even analogy in the feathered race to guide me, for how can one expect a precedent in aught that pertains to so exceptional a species as the cuckoo? but still I have some sort of corroborative evidence to adduce from the insect world. I allude to the case of bees; and it is now an acknowledged fact that in the event of any accidental destruction or unexpected loss of the queen bee (when provision had not been made for her successor, after the usual custom, by rearing princesses in the cells specially prepared for the royal brood) the nurses will adopt the grub of an ordinary worker, and by feeding it with a special diet, reserved on other occasions for the royal cells alone, will from that worker grub develop a queen, differing in size and colour as well as vocation from the individual it would under ordinary circumstances have become.* Such a permanent effect in this case has a particular diet on the unconscious and passive infant.

I repeat that the theory I have been discussing is but a fancy, but possibly it may be worth examination. When first it occurred to me I made an effort to get it corroborated, or overthrown, by laying it before one whose authority in such matters is of European reputation, and who would have carried conviction in its favour, or

* See Bevan on the Honey Bee, p. 21.

the contrary, by any decided opinion upon it he expressed. But when, in answer to my enquiries, he most kindly replied "that he had no sufficient information on the point, such as would warrant him to pronounce any dogmatic judgment on it," I thought it not altogether worthless; and hence I submit it to the readers of the 'Zoologist.' I should, however, in candour own that the naturalist to whom I wrote, but whose name I have no authority for mentioning, added, "My *impression* is that differences of food would *not* produce the effects which you suppose possible; and that impression is derived chiefly from there being hardly any evidence of variations being due to slight differences in the nature of the food." My correspondent then proceeds to give me several interesting examples of change of colour in plumage, and especially calls my attention to the paper (in Proc. Zool. Soc.) on the Australian cuckoos by Mr. Ramsay, where that gentleman "states that two of the species when they lay their eggs in an open nest, manifest a decided preference for nests containing eggs similar to their own in colour."

This is all I have to say about the eggs of the cuckoo. It is true that we have arrived at no absolute conclusion: we have yet much to learn about that mysterious bird. Still I submit that the discussion which has taken place in the pages of the 'Zoologist' has not been without its value, nor without its interest; and I for one shall be exceedingly pleased if the subject is renewed next year.

ALFRED CHARLES SMITH.

Yatesbury Rectory, Calne,
September 6, 1873.

*Report of the 'Close Time' Committee of the British Association
for the Advancement of Science (Section D).*

BRADFORD, 1873.

THE COMMITTEE re-appointed at Brighton, for the purpose of continuing the investigation on the desirability of establishing a "Close-Time" for the preservation of indigenous animals, beg leave to report as follows:—

1. The apprehension expressed by your Committee in their last Report, as to the probable effects of the Wild Birds Protection Act, has been more than justified by events, for, so soon as that Act came to be applied, it gave almost universal discontent, and your Committee have not found one person who is satisfied with it.

2. In the House of Commons, Mr. Auberon Herbert moved and obtained the appointment of a Select Committee to consider the subject of the Protection of Wild Birds.

3. Three members of your Committee, on being summoned, gave evidence before the Select Committee of the House of Commons.

4. The Report of the Select Committee of the House of Commons has not, to your Committee's regret, yet been published, but your Committee have good reason for believing that it will contain the following recommendations :—

- “(i) That the protection of certain wild birds named in the Schedule of the Wild Birds Protection Act of 1872 be continued.
- “(ii) That all other wild birds be protected from 15th March to 1st August, provided that owners or occupiers of lands, and persons deputed by them, have permission to destroy such birds on lands owned or occupied by them.
- “(iii) That one of Her Majesty's Secretaries of State be empowered to except, in any particular district, any bird from the protection afforded, either by the Act of 1872 or by the proposed Act, if he think necessary to do so.
- “(iv) That, for the sake of giving better protection to the swimmers and waders, no dead bird, if such bird is mentioned in the Sea-Fowl Preservation Act, or the Wild Birds Protection Act of 1872, be allowed, from 15th March to 1st August, to be bought and sold, or exposed for sale, whether taken in this country or said to be imported from any other country.
- “(v) That any violation of this proposed Act, or of the Wild Birds Protection Act of 1872, be punished by the payment of costs alone for the first offence, except under aggravated circumstances, and the payment of costs and a fine not exceeding 5s. for every offence after the first.”

5. Your Committee wish emphatically to condemn these recommendations as a whole, and all but one of them separately, for the following reasons, numbered as are the recommendations :—

- i. The great majority of the birds named in the Schedule of the Act of 1872 do not require protection, as has been shown in former Reports of your Committee; they therefore think that in the present state of public opinion it is inexpedient that such protection should be accorded to them.
- ii. That for the sake of protecting other wild birds, most of which certainly do not want protection, rights would be continued to owners and occupiers of land which would be denied to other persons: consequently the principle of privilege, usually urged as one of the strongest objections to the Game Laws of this country, would be introduced into the proposed Act, which would thereby be subject to the attacks of all those who are

opposed to those Laws. Further, that if there be any need to protect such other wild birds, the need is greater, in most cases, to protect them from the owners and occupiers of land than from other persons.

- iii. That the power to be given to the Secretary of State would virtually be that of repealing the Act, either entirely or in regard to any particular kind or kinds of birds, at his sole will and pleasure, without his acting on the opinion of any responsible adviser or expert assessor; and that in consequence of such unlimited power being entrusted to a high officer of State, who cannot be expected to have any personal knowledge of the intricacies of the questions involved, the results would in most cases be highly unsatisfactory to all persons concerned; it being also taken into consideration that the state of the law would vary very considerably in different parts of the country, even perhaps in different parts of the same county. Furthermore, the granting of such power to any authority presumes that some kinds of birds would be at once exempted from protection, which is tantamount to inviting persecution on such kinds of birds as would be included in what has been termed a "Black List."
- iv. With this recommendation your Committee have the pleasure of entirely concurring.
- v. The anticipation of your Committee, that the penalties imposed by the Act of 1872 would be found insufficient, having been proved by experience to be true, your Committee consider that the proposed increase of such penalties is quite inadequate to secure efficiency to the new Act; regard, however, being had to the indefinite phrase, "except under aggravated circumstances," the meaning of which your Committee cannot explain.

Finally, your Committee wish to point out that, so far as they have the means of knowing the nature of the evidence given before the Select Committee of the House of Commons, the four recommendations which they condemn are directly opposed to that evidence.

6. The increasing interest taken by the public generally in the question which your Committee have been now for five years appointed to investigate, is shown by signs too numerous to mention. Your Committee, however, observe with regret that in the minds of some persons it has been mixed up, if not confounded, with other questions which are entirely distinct. Two of these may be specified—(1) the Utility of Birds to Agriculturists, and (2) the State of the Law as regards Cruelty to Animals. Your Committee not having been appointed to consider these questions, content themselves with remarking that both are doubtless of great importance to the community, the one from a moral and the other from a material point of view, but are likewise entirely outside the duty of your Committee.

7. In order to assist the clearer view which your Committee hope that the public will in time take of the question of Bird-Protection, your Committee unanimously beg leave to submit for consideration the following remarks as to any future legislation :—

- (1) However much we may desire it, we cannot in practice stop the killing of some birds during the breeding-season : if we pass a law totally prohibiting it, that law will either be evaded, or, if enforced, will become so irksome as to be speedily repealed.
- (2) No law, to be effectual, should pick and choose certain kinds of birds, leaving out nearly-allied kinds.
- (3) An effectual law, dealing with a whole group of birds, may be passed, as witness the highly successful 'Sea-Birds Preservation Act.'
- (4) A law protecting birds which cannot be shown to want protection is a mistake.
- (5) The crucial test of whether a bird wants protection or not, is whether its numbers are decreasing or the contrary.
- (6) With some very few exceptions (nearly each of which can be satisfactorily explained), none of what are commonly known as "Small Birds" are decreasing throughout the United Kingdom generally.
- (7) Most "Small Birds" are generally increasing in numbers, some remarkably so.
- (8) Setting aside "Sea-Birds," which may now be considered safe, no birds have so much diminished in numbers as "Birds of Prey" and "Wild Fowl."
- (9) No law for the protection of "Birds of Prey," if passed, could be at present carried out.
- (10) A law protecting "Wild Fowl," if passed, could be carried out effectually, provided that the penalties are in proportion to the inducement to break it.
- (11) "Wild Fowl" form a group subject to great persecution on account of their marketable value, especially as articles of food : they are commonly killed (many of them because then more easily killed) long after they have paired and have begun to breed ; they, besides, lie under the same disadvantage as do the few "Small Birds" which are decreasing—the diminution, namely, through agricultural improvements, of their breeding-haunts : already many kinds of "Wild Fowl," which a few years ago used to breed frequently and regularly in this country, have ceased or nearly ceased from doing so : they are perfectly innocuous ; consequently "Wild Fowl" are eminently deserving of protection.
- (12) The principle of what has been called a "Black List," favoured by some persons, would be the most fatal step of all in Bird-Protection, since it would discourage, if not entirely check, the

healthy feeling which is steadily, if not rapidly, growing in favour of many birds which have long been persecuted.

8. Your Committee respectfully urge that they may be re-appointed.

The Mammoth still in the Land of the Living.—The 'New York World' describes an interview between one of its correspondents and Cheriton Batchmatchnik, a Russian convict, lately pardoned by the Government in consideration of his wonderful discoveries in Siberia, to which territory he had been banished for smuggling. Cheriton had escaped from the mines of Nartchinsk, and having reached the mountains struck southward for the Amoor River, intending to get to China. Meeting Cossacks, he again turned north, and essayed what seemed to be a pass in the great Altai range. For thirty days he scrambled about seeking in vain for an outlet. At length he got out to the north, together with one of the branches of the Lena river. He then turned eastward, and was entering the gorges of the Aldan mountains when winter overtook him. Across the snow, however, came vast troops of animals, all going the same way. Cheriton followed them, arrived at the summit of the range, and there, far below his feet, landlocked between great ranges of hills on all sides, lay a valley fifty miles wide by one hundred and fifty long, and centred by a blue lake. He descended and found the valley warm and fertile, and full of animals. At night he made a fire and lay down beside it to sleep. During the night—"Dark shadowy forms came over the water, splashing towards him, and seemed to seek what his fire might mean. The trampling of great beasts, that crushed the willow-stalks like pipe-stems, on their way to the water's edge, and that came and stood over him, breathing heavily and slow as they seemed to gaze at the fire with stupid wonder, made him afraid each moment of being overrun. Wild eyes, reflecting the fire-light, shone around him out of the gloom upon all sides, and wilder cries and howls gave new horrors to his position. He sprang to his feet almost paralysed with fright, and fired off his pistol at the nearest intruder. The echo of the shot rang long around him, and it seemed the signal for the cries of a thousand new monsters to burst forth. There were mad, plunging rushes of frightened beasts around him that made the ground tremble; a peculiar long, shrill, quavering shriek sounded over the lake, and was answered by a harsh, full-guttural bellow near at hand. When Cheriton awoke it was broad day, and there were no traces of the animals that had disturbed him over night, except the paths they had worn going down to the water. In these paths he saw the deep-planted spoor of some animal larger than anything of the sort he had ever before beheld. His first care was to seek some place to pass the next night, where he could be free from

the alarms that had made the past night so terrible. He re-crossed the meadow, and followed the edge of the slope around in the direction in which he saw some rocks. Among them he found the wide and lofty entrance to a cave. He entered with some precautions, for the rocky pavement was worn as if by use, and within he heard a slow, measured movement as of an animal gently ruminating, and heavily breathing with great calm inspirations and expirations like the sigh of a smith's bellows. One turn, then another, he heard a heavy startling snort, and there in the half light of the cave, standing full before him, alive, chewing the cud, and waving its proboscis to and fro with a slow, gentle, majestic motion, he saw—a mammoth! 'I did not know then,' said Cheriton, 'what I have since been told, that Siberia was an old habitat of these animals, and that some of the best scientific judges are uncertain whether to look upon the remains found on the shores of the Arctic Ocean as fossil animals or as the remnants of wandering herds caught and perishing in storms, individuals of which may still exist under favourable circumstances. Without intending it I have solved that doubt.' Cheriton describes the mammoth as being a very imposing looking animal, covered with reddish brown wool and long black hair. During his stay in the valley he was close to five of them, all of which were nearly of a size, being about twelve feet high, eighteen feet long, with tusks projecting about four feet, and being eight to ten feet counting the curve. The skin, which was bare on the upper surface of the ears, on the knees, and rump, was of a mouse-colour, and seemed very thick. The animal was nocturnal in its habits, frequenting caves or forest depths by day, and feeding at night and early morning. Cheriton thinks there might be some fifteen or twenty of these monsters in the valley altogether, but that all these are aged, and that very few are born now-a-days. At any rate he saw none that had the least appearance of being young. They were very peaceable animals, torpid and sluggish as old oxen, never disturbing Cheriton, nor indeed taking much notice of him. * * * The lake was inhabited by a monster of which Cheriton was in constant dread, a sort of saurophidian, which he described as being thirty feet long, and armed with scales and horrible fangs. This monster—he never saw but the one—was master of the lake, and lived by devouring the animals which came by night to its brink to drink. Cheriton gives a graphic and exciting description of a contest which he witnessed one morning at early dawn between this crocodile-serpent and one of the mastodons. The battle, which lasted more than an hour, ended in the discomfiture of the mammoth, which could barely limp away after having been constricted in the serpent's folds."

[Although fully aware of the advantages of what the late Thomas Moore called a "heliacal rising," I postponed the publication of this extraordinary narrative for a month for two reasons: *first*, because my notice of Mr. Moggridge's volume had already been deferred for an unreasonable time; and

secondly, because I thought it possible some counter-statement about the mammoths might appear, showing that the narrative itself was one of those *jeux d'esprits* for which our transatlantic brethren are so deservedly celebrated. A month, however, has elapsed, and not only have we received no official contradiction, but the statement has been thought worthy of reproduction by Professor Feuchtwanger, before the "American Association for the Advancement of Science." The learned Professor says:—"The discovery of the mammoths in Siberia in the deep gorges of the mountains near the Lena Viner, which was lately published as having been made by a scientific Russian convict, who had seen five living animals, twelve feet in height and eighteen feet in length, with projecting tusks four feet long, excites some discussion in Europe. I think it worthy of inquiry whether the mammoth of the post-tertiary period, discovered during this century in Siberia, near the same river, can have any relation to the convict's discovery. Thousands of these animals have been found buried in the ice, with their well-preserved skins, and thousands of tusks are brought to England to this day for the use of the turner. These are of nearly the same dimensions as those seen by the Russian. The convict has received an unconditional pardon, on the recommendation of scientific men who have investigated his statements and believe them to be true." I must confess to feeling some hesitation in receiving as true Zoology such an astounding statement; there are also certain of the details, particularly that relating to chewing the cud, which could scarcely emanate from a "scientific" observer, and so the learned Professor calls him. I would avail myself of this opportunity for inviting attention to a paper of my own on the Siberian mammoth, published at page 1 of the 'Zoologist,' under date of January, 1843. From this it appears that M. Klaproth published a note on the same subject in the 'Memoirs of the Academy of St. Petersburg' in the early part of the present century (see vol. v. p. 409). In this there is abundant evidence of the head, tusks, legs, and even entire bodies of mammoths having been repeatedly found, at the beginning of the present century, in so recent a state that bears and dogs fed on the flesh: portions of skin and hairs are preserved in the Museum of the London College of Surgeons. The extract from the 'New York World' is reprinted from the 'Standard' newspaper.—*Edward Newman.*]

Blackbird Nesting on the Ground.—I may add two other instances of this to the already numerous accounts which have been published: one was in the forest, and the nest was built at the root of an old thorn bush, and when found it contained two eggs. The other instance was on the heaths in the vicinity of Ringwood; the nest was built on the side of a hill, under an overhanging tuft of heather. I frequently inspected this nest

from its commencement, and eventually the old birds brought off a brood of four.—*G. B. Corbin; Ringwood, 1873.*

Dartford Warbler.—I have somewhat recently had the pleasure of making the acquaintance of this interesting little species, and although perhaps my observations are shallow, yet I trust they are not wholly devoid of interest. I first detected the species, upon a wide heath with here and there patches of furze, on the 1st of January of the present year, when I saw a single male, whose presence at that time of year adds another proof of the species, some at least, wintering with us in the South of England. I also saw a pair of the birds, at the beginning of February, not far from the place where I had previously seen the male, so I searched most closely on subsequent occasions in the hope of finding their nest, but without success. On some of my visits I did not see or hear the birds at all, and seldom had a good view of them even when they were detected, as they are exceedingly restless, especially when closely watched. However, on the 4th of August I had the pleasure of watching two pairs for an hour or more. It was a somewhat difficult matter to get a good sight of them, unless great caution was exercised, and furze bushes are not the most agreeable neighbours at any time, and especially when you have to be continually changing your position amongst them. I noticed that these little birds almost invariably flew in pairs, and seemed greatly attached to each other. Their flight was a jerking sort of motion, somewhat similar to the longtailed tit, and the long tail of this warbler helped to increase the similarity. They were continually fluttering from one bush to another, and if one of the birds flew a greater distance than usual its mate was sure to follow it very soon. They generally, I may say invariably, entered the bush at or near the bottom, and on first alighting always jerked their tail up and down a few times, then proceeded to inspect the branches of the furze very minutely, seeming to capture any tiny insect that was lodging in the crevices of the bark, and at this time the bird appeared entirely absorbed in its work, as on one occasion it came so near that I could almost have touched it with my hand if I had chosen. In its activity and vigilance it reminds one of the blue tit upon a budding apple tree, or a sedge warbler amongst the peasticks in the garden, as its attitudes are often grotesque and at all times very pleasant to a lover of the feathered tribes, who ever loves to watch the quick eye and lithe movements of his tiny pets. The notes of the Dartford warbler are somewhat varied; it has a single note, like "cheep," which it utters once or twice at intervals, and especially when one bird is calling the other, but when they are together searching amongst the furze branches they keep up a continued and pleasant sort of chatter, which is very difficult to describe by words; there is, however, a passage in this ditty which is pretty nearly expressed in the syllables "chit-to-we," laying particular stress upon the first. Its vocal powers are not very strong, as, from its small size, we

might imagine to be the case, for in this particular ability it does not resemble our common wren, whose strength of song, at times, appears not reasonably to belong to its puny possessor. As far as I have been able to observe, the habits of the Dartford warbler are altogether unobtrusive and retiring, and, unless looked for, it is seldom seen; and, unlike its almost constant companion, the stonechat, it seldom perches in a conspicuous position, but once or twice during the summer I saw the male perched on the top of a furze-bush, singing its peculiar little song very sweetly. But although retiring in disposition and apparently shy, the bird is, I suspect, seldom resident near a lover of birds without being detected, for its notes are different from any other bird I am acquainted with; and once seen it is not easily overlooked, for its short wings and long tail, together with its dark plumage, at once separate it from any other warbler. A few weeks since a gamekeeper had doubtlessly seen the birds about which I have written, as he told me he had seen some small birds of nearly a black colour and with long tails amongst the furze bushes, where I had previously seen the male on the 1st of January; so I suspect, with some show of reason, that the species has bred in the locality this summer. The gamekeeper, however, like myself, was quite unsuccessful in discovering the nest, though at the end of July he told me he had seen one of the old birds with something in its beak, as if it had young ones in the neighbourhood. The species is said to be not uncommon in the New Forest in the summer time, but I am quite sure it is not of usual occurrence in those parts where I most often collect insects; and during the past summer I met two men whose precarious living seems to be obtained at that season by taking birds' eggs and selling them, and neither of these men appeared to know the bird, or anything of its nidification, and I suspect they would if it was as common as it has been represented to be, as they had eggs of the stonechat, chiffchaff and willow wren, beside woodpeckers, &c., when I met them.—*G. B. Corbin.*

Criticisms on Mr. Durnford's "Ornithological Notes."—In the September number of the 'Zoologist' (S. S. 3694) Mr. Durnford writes in reference to a note of mine which appeared (S. S. 3641): "He is right in saying that in more than one instance I have gained my information second-hand, which he appears to speak of in very disparaging terms, though almost in the same breath giving us a second-hand note himself." Far be it from my intention to write disparagingly of second-hand information unless it is evidently erroneous, which it appears to be in this instance. Mr. Durnford has mistaken my meaning and intention when I penned the sentence to which he takes objection, *viz.* "In more than one instance in which this gentleman appears to have gained his information second-hand, I am inclined to hazard the opinion that he has been misinformed." In this sentence I endeavoured to transfer the *onus* of an obvious mistake from Mr. Durnford to his informant, and attempted to cover his retreat by mentioning a communication

I had received from a Scotch correspondent (a most accurate and careful observer) which bore somewhat on the subject. As Mr. Durnford states that he thoroughly believes in the trustworthiness of his informants, one of whom told him that in the end of May the young of the Sandwich tern had flown and left the neighbourhood with their parents, all I can say is, that I do not, nor would any other person who had paid attention to the breeding habits of this species in Great Britain.—*H. W. Feilden; Woolwich, September 1, 1873.*

The Flamingo Killed in the Isle of Sheppey.—The fact of a flamingo having flown away from the Zoological Gardens only two or three days before the notice of one having been killed in the Isle of Sheppey (S. S. 3693), renders it extremely probable that this escape was the bird in question. I was only aware when it was too late to correct the paragraph of the loss the Zoological Society had sustained.—*Edward Newman.*

Vipers in the New Forest.—This reptile has been unusually abundant in the forest during the summer, whilst its relation, the common snake, has been comparatively rare; I have not seen above half-a-dozen of the latter during the whole season, whilst I have killed as many vipers, and saw a great many more, in one day's entomological ramble in the woods and on the heaths. In July, whilst with a friend, searching amongst some grass for specimens of the pretty little moonwort fern, the locality for which we had discovered the previous summer, I almost knelt upon a viper about twenty inches long, but it made good its escape into a large and very tangled bed of moss and heather, and we continued our search somewhat unsuccessfully, and had almost forgotten the viper, till my attention was attracted to the bed of heather by a very slight but seemingly most peculiar noise, and as we had never heard a viper make any but a blowing or hissing noise, we determined to find out what it was: setting to work very cautiously we gently removed the moss, &c., and were not long in finding a hole, which led into a sort of gallery, and from which this peculiar little sound came. We carefully removed portions of this gallery and as we approached the inner end saw the viper glide away from a mouse's nest, in which one very young mouse, about the size of a ground-beetle, was left. We concluded that the viper had swallowed the other, probable, inmates of the nest, and had relished the dainty morsels, but having a wish to ramble farther just then he had made off, as we searched in vain to discover his whereabouts. Whether the viper had destroyed the parent mice, or that they were on a foraging expedition, I am unable to say; we did not see them. Had we caught the viper we should certainly have dissected the glutton. Is it possible that the continued slaughter of the hawks, kestrels, &c., may account for the increase in numbers of the viper?—*G. B. Corbin.*

A few Notes on Flying Fish.

By GERVASE F. MATHEW, R.N., F.L.S.

DURING long voyages in the Atlantic and Pacific Oceans I have had opportunities of closely observing the habits of flying fish, so perhaps a few remarks about them may not be devoid of interest.

The first point to be considered is whether these fish make use of their pectoral fins, after they have once sprung from the sea, to aid them in prolonging their flight. Now, in many books I have read it has been stated that these fins are never so used, but kept rigidly expanded until the fish drops into the sea; and, again, somewhere else I have seen it just as confidently asserted that they always make use of them. As far as my experience goes neither of these statements is correct, for I have frequently seen the pectorals used, though not perhaps as a rule, as it entirely depends on the length of flight the fish is desirous of making and the force of the wind at the time. In the Atlantic Ocean during our long passage from Plymouth to Magellan's Straits I never saw a fish flutter its pectorals in any way, but they were by no means so abundant in the Atlantic as in the Pacific Ocean, where these observations were chiefly made, while on a voyage in the tropics from Payta in Peru to Honolulu in the Sandwich Islands. There is no doubt, although, as I have said before, it has been questioned, that these fish when taking long flights have the power to use, and constantly do use, their pectorals to assist them in prolonging their course, for I have observed that those fish which usually take the longest flights invariably on leaving the sea vibrate their fins rapidly several times in succession, and after proceeding for a hundred yards or so descend with a gliding motion to a wave-crest, strike the water smartly with their tails* and ricocheting proceed onwards with renewed flutterings of the pectorals and fresh vigour. In this way fish can sustain their flight for more than three hundred yards, and at no time when they strike the sea do they entirely submerge themselves. On one occasion a large shoal numbering many hundreds, frightened by the passing ship, sprang from the sea close alongside; at the time I was standing in the stern walk, and my attention was drawn to them by the noise caused by the fluttering of their numerous fins, and this shoal

* The lower lobe of the caudal fin is twice the size and double the strength and thickness of the upper portion,

proceeded to a considerable distance before falling into the sea. When these fish merely take a short flight they leap from the water, spread their fins, proceed a little distance and fall into the sea again with a splash; and, indeed, they all do this, for they do not seem to have the power of diving gracefully beneath their native element.

The distance they are able to traverse at one time has been variously estimated. As a rule I should consider fifty yards the ordinary extent of their flight, although this of course depends on the force of the wind and the direction the fish may be taking. Two hundred yards would be an unusually long flight, but I have occasionally seen individuals go at least a hundred yards further, and I believe if hard pressed they could even exceed that. The distance a fish travels through the air after ricocheting from a wave-top before it again touches the sea, is often much greater than its original flight, and besides gaining fresh impetus from this contact they also re-moisten their gills and refresh themselves. Were they not to do this they would be unable to proceed far, for the tropical sun striking down on them would soon dry up the delicate filaments composing their breathing apparatus. With regard to their position when leaving the sea, and their power to turn to the right or left of their original course of flight, I feel sure, from the observations I have made, that they nearly always rise head to wind, but can turn to the right or left at pleasure. Sometimes indeed they will turn completely round and go away rapidly to leeward. What struck me as a most peculiar characteristic is their power, when in the air, of rising and falling with each swell, for during moderate weather I have often observed them spring from the sea, glide above a wave, fall into the succeeding hollow, rise to the next wave, and so continue to the end of their flight without once touching the sea. Occasionally when alarmed they rise anyhow, and proceed towards all the points of the compass. When in mid-flight I do not believe they can *suddenly* divert their course, for one afternoon, as we were steering for the anchorage off Arica, a fish emerged from the sea within ten yards of the ship and flew directly towards her, coming so violently into contact with the ship's side that it fell stunned, and floated astern on the surface of the sea with its pectoral fins rigidly expanded.

In some book, a long while ago, I remember having seen a pretty picture representing a shoal of flying fish hotly pursued by

dolphins ; some of the poor fish were seeking safety in the air, but even here they were being pounced upon by a number of birds, so that they seemed to have no chance of escaping whatever. Now the dolphin part of the picture is correct enough, for these beautiful fish (*Coryphænæ*) are the direst enemies flying fish have, being endowed with wonderful powers of speed, and indeed often leaping from the sea in pursuit of their prey ; and, added to this species, I have no doubt boneta, albicore and various other predacious creatures are constantly chasing them, and to escape these they seek shelter in another element, but I have never yet seen a bird of any description attempt to seize them while in the air, nor am I acquainted with anyone who has witnessed such a thing. As far as my experience goes (in the Atlantic or Pacific Oceans) I know of no bird that could manage to catch them ; the various species of albatross, petrels, gulls, skuas and shearwaters are either too slow on the wing or too small. Frigate birds are said to stoop at them, but I have not seen them do so ; gannets and pelicans might strike at them from aloft when they are *in* the sea, but these fish do not come in any numbers close to the land, nor do gannets or pelicans proceed far to sea. I have seen tropic birds wheeling round and round above the sea while flying fish have been leaping below, but they never took any notice of them ; there may, however, be birds in the Indian or Chinese Seas that are in the habit of seizing them.

I do not imagine that these fish spring into the air only when pursued by their natural enemies ; on the contrary, I feel satisfied they do so much more frequently of their own accord, out of pure pleasure and enjoyment. There is no prettier sight than a number of these fish in the air, with the bright sun shining on them and making them glitter like burnished silver. Sometimes they rise singly, sometimes two or three together, and often in shoals of hundreds ; in the latter case, as they nearly all fall into the sea again together, the effect is striking and peculiar, as each fish throws up his individual jet of white spray, making it appear as if a charge of canister had been fired over the surface of the water.

Is it known where these fish deposit their spawn ? I am inclined to fancy in mid-ocean, for I have seen them not an inch long more than a thousand miles from the nearest land, and these minute specimens when in the air bear a strong resemblance to locusts on the wing.

There are several species of flying fish in the Pacific, and the largest possesses a conspicuous oval purple spot at the base of the pectorals.

From the above observations I have come to the following conclusions:—

1st. These fish frequently vibrate, or flutter, their pectoral fins during flight.

2nd. They gain fresh impetus by striking and ricocheting from the crest of a wave.

3rd. They are able to turn to the right or left of their original course of flight.

4th. The average distance of flight is about fifty yards, although they are able, according to circumstances, to prolong it to a greater distance.

5th. They do not merely spring from the sea to avoid enemies, but just as often for their own pleasure.

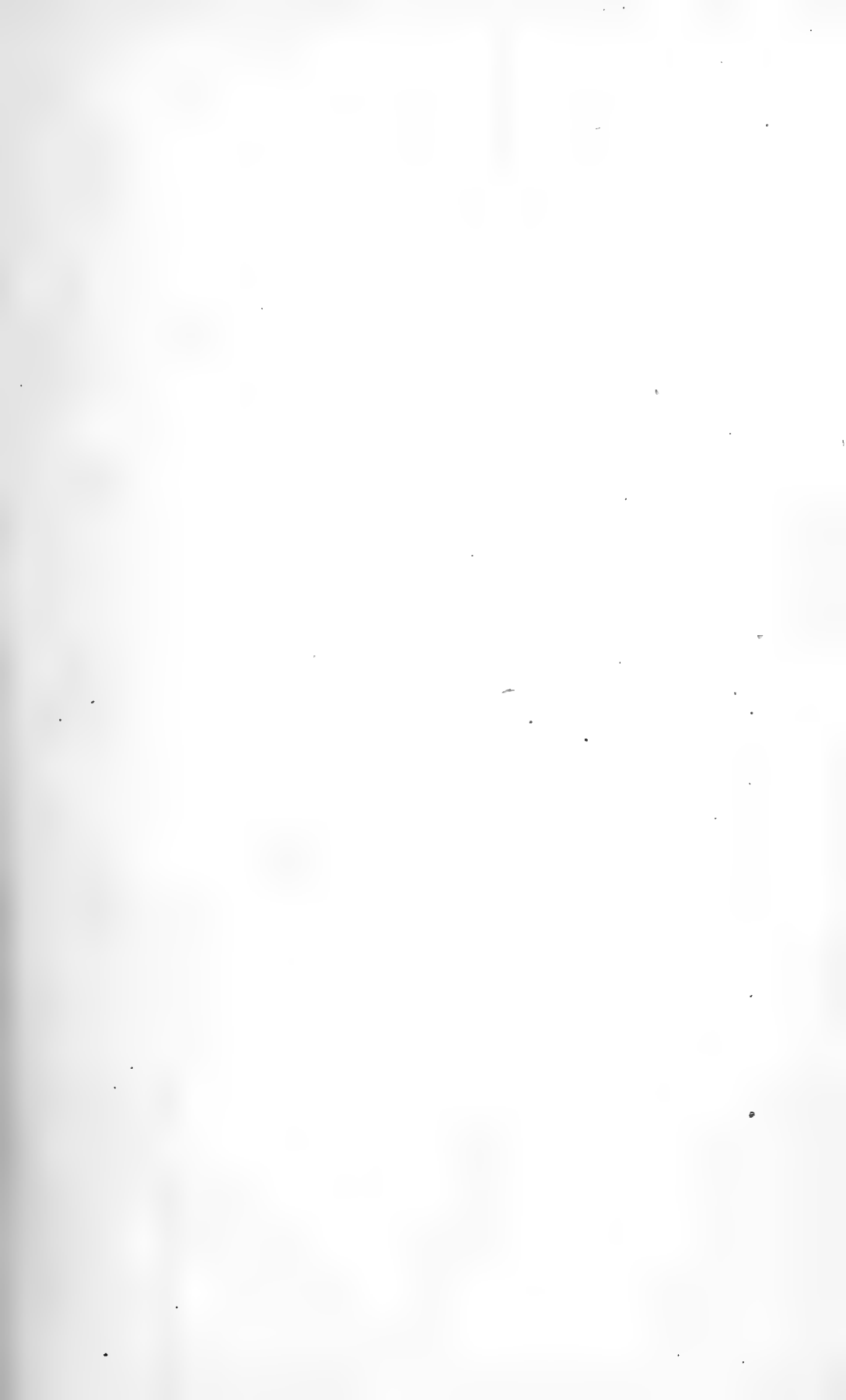
6th. While in the air they are seldom seized by birds.

The Hawaaiians catch great quantities of these fish and bring them to the market for sale. They average a pound and a half each, are rather dry and tasteless, but acceptable to anyone who has been without fish for a length of time.

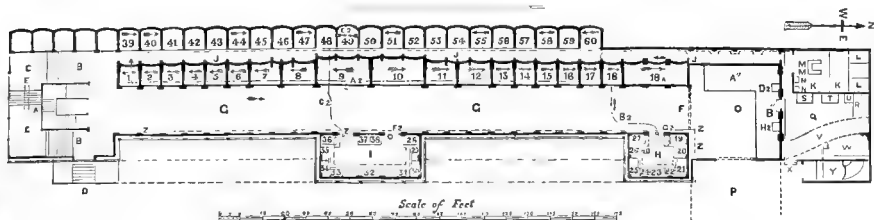
GERVASE F. MATHEW.

H.M.S. 'Repulse,' Honolulu, Sandwich Islands,
June 25, 1873.

King Crab off the Dutch Coast.—I have examined a fine specimen of *Limulus Polyphemus*, taken in July last, by the Yarmouth trawl-boats, about eleven miles off the Schelling light on the Dutch coast, in about ten fathoms water. Dr. Norman, of Yarmouth, tells me certainly four have been taken, perhaps five, two of which are recorded in 'Land and Water' as *L. longispina*. I have not seen these specimens, but doubtless they are the same species as the one which I have examined. A king crab is also recorded in 'Land and Water' of 26th April last, as having been taken on the coast of North Wales; an editorial note appended says it is a North American species, and could not have been caught in North Wales: there can be no doubt, however, as to the locality of those brought in by the Yarmouth fishermen. Dr. Norman informs me he has also obtained, from the same source, a fine specimen of the northern stone-crab (*Lithodes Maia*).
—T. Southwell; Norwich, September 12, 1873.



PLAN OF CRYSTAL PALACE AQUARIUM.



KEY TO PLAN.

- A Staircase from Palace.
- BB Staircase to Palace
- CC Storerooms below Staircases
- D Communication with Palace Grounds (public)
- E Tarnishes
- F Screen at north end of Saloon.
- GG Saloon, containing Marine Tanks 1 to 18.
- H North Room, containing Marine Tanks 19 to 27
- I South Room, containing Marine Tanks 28 to 38
- JJJ Attendants' Gallery, containing reserved Marine Tanks 39 to 60. (Private.)

- KK Room, containing as follows:—
- LL Two Steam Boilers, and
- MM Two Steam Engines, and
- NN Two Steam Pumps.
- O Junction, with Conservatory, to contain Fresh-water Tanks. A" B"
- P Part of Conservatory (upper end)
- Q Workshop
- R Slab for preparing Food for Animals
- S Store Cupboard.
- T Slab.
- U Sink.
- V Flue.

- W Office.
- X Communication with Palace Grounds (private).
- Y Heating Apparatus room.
- ZZ Heating Pipes.
- A2 Sea-water Pipes supplying Tanks 1 to 18.
- B2 Sea-water Pipe supplying Tanks 19 to 27.
- C2 Sea-water Pipe supplying Tanks 28 to 38.
- D2 Point of issue of Sea-water from Reservoir to circulating system.
- E2 F2 G2 Three points of entrance of Sea-water from circulating system to Reservoir.
- H2 Float showing height of Sea-water in Reservoir.

The direction of flow of Sea water in the Tanks is shown by arrows, which for want of space are omitted in Tanks 19 to 38, 41 to 43, 45, 46, 48, 50, 52 to 54, 56, 57, and 59.

Notices of New Books.

Official Handbook to the Marine Aquarium of the Crystal Palace Aquarium Company (Limited). By W. A. LLOYD, Superintendent of the Aquarium. Fifth Edition, revised and enlarged. 1873.

(Continued from S. S. 3711.)

Era III.—COMMERCIAL AND AMBITIOUS.

From the preceding pages it must, I think, be evident that nearly all the conclusions at which we arrived during the First and Second Eras require careful reconsideration. I cannot say that what has been termed the balance of nature—so much water, so much air, so many animals, so many plants—is altogether a mistake; but I do without hesitation say that we made too much a rule-of-three sum of the affair, and that the formula we were in the habit of laying down was framed under the idea that by the aid of experience we could define what laws ought to govern Nature, rather than leave Nature entirely unfettered, and humbly ask her to show us how she governs herself; for, as a sea-cave in full flower with anemones is far more beautiful than anything we can achieve by our own management, so are the concomitant conditions which have produced that result infinitely more subtle than any arrangements we have in our power to devise. As for sea-weeds in a state of nature, I deny none of the properties which have been attributed to them, but I maintain that in our clumsy attempts to introduce sea-weeds into our fictitious seas, we frustrate rather than promote the object we have in view; and it is not a little curious that when Nature was actually sowing broadcast her Algæ and Confervæ in our aquariums we deliberately laid our unwise heads together for the express purpose of defeating her beneficent intentions. We wrote instructions how to get rid of the green growth that was such a nuisance in our otherwise successful aquariums: it is as though a man writing on breeding poultry were to recommend the destruction of all the chickens. Nature should be her own marine gardener. There should be a bottom and sides to an aquarium—this seems an absolute necessity, whether that aquarium be an ocean or a tank; and Nature, unassisted and uninvited, will clothe the bottom and sides with a drapery of vegetation wherever the light can penetrate.

The seeds of sea-weeds are ever floating in the water, and ever ready to find anchorage where they meet with a stable surface. So universal is this sporadical growth of aquatic vegetation, that I believe it impossible for a stone to be immersed in water under the influence of light, without attracting the seeds of aquatic plants, and these will assuredly vegetate on its surface; and it is also a most indubitable fact—a fact that loses none of its importance by frequent repetition—that this humble vegetation emits, in a powerful light, a series of ascending bubbles of oxygen.

But there is another necessity, a necessity which aquarians of the first and second eras, as we have seen, not merely refused to acknowledge, but took the utmost pains to condemn. I think it probable that every naturalist who trusts himself on the ocean, even for a dozen hours, and from the deck of a steamer snuffs the invigorating breeze as it passes over the agitated surface of the water, will after a while admit that some other principle is at work beside the maintenance of an exact balance between the breathings of sea-weeds and the breathings of sea anemones or fishes; and will perhaps also admit that motion is such a principle. It has been asserted by voyagers over and over again that the sea itself becomes foul during a long calm, and that its life-supporting powers seem absolutely to have departed; fishes and pelagic crabs die by myriads and float on the surface, and, together with dead sea-birds and detached sea-weeds, constitute a putrid, fœtid, fever-generating scum, more dreadful, more fatal to man, than when the great deep is in its wildest and stormiest moods. The introduction of sea-bang, sea-lettuce, sea-endive, sea-whistle, sloke, dulse or carrageen will not remedy this. Whatever quantity of these life-restoratives be cast upon the waters, they will do harm rather than good; they will float on the surface, decay, and add to the seething and putrefying mass. A more powerful agent is required, and Nature kindly supplies it. A breeze springs up; a change comes o'er the spirit of the scene; motion sets in, and all is restored. We read that in a space of time incredibly short, the water resumes its life-sustaining power, and every trace of impurity has vanished as by a miracle. These narratives must, I think, convincingly establish to those who read them, the fact that there is no necessity for changing the water. When the life-sustaining power of the sea has been exhausted, Nature herself restores it, and the restoring element is motion. She has no power to change the

water; the same sea must be used again and again; the same water must be encompassed by the same land. However clearly the theory of change in relative position may have been established—however manifest it may be that the ocean now rolls over what was once dry land, and that what is now dry land was once covered by the sea—still there is nothing new, nothing added, nothing subtracted; the same materials remain, fluid and solid, and will remain for ever. Motion continually exposes a fresh surface to the atmosphere, and this contact of air and water, called aëration, is in continual operation.

“The great want felt,” says Mr. Lloyd, “was *constant motion* like that of Nature, by which the water may be continually turned over and over, presenting successive and multitudinous surfaces to the surrounding atmosphere, and may by contact with it incessantly absorb large quantities of oxygen necessary for the sufficiently rapid decomposition of organic matter given off by the animals.”—‘*Handbook*,’ p. 18.

Twenty years before this the absolute necessity for motion and aëration was, I believe, first pointed out by Mr. E. W. H. Holdsworth, in his ‘*Handbook to the Fish House in the Gardens of the Zoological Society of London*.’ This excellent little pamphlet is not only useful as a companion to the aquarium, but is a philosophical exponent of the only principles and arrangements on which marine aquariums can be established so as to become permanently successful. Mr. Holdsworth has shown himself perfectly acquainted with his subject, and thoroughly competent to explain it to others. The ‘*Handbook*’ is now so exceedingly rare that I need make no apology for the rather long quotation given below.

“The main difficulties at present met with in the satisfactory maintenance of the aquarium are unquestionably due to our ordinary inability to imitate that most important condition of the sea—its continual motion. The advantages derived from that movement are incalculably great to its inhabitants; so much so as to mask, in a great measure, the principle of *compensation* on which plants and animals are largely dependent for the supply of the gases necessary for their respiration. In a small tank the presence of decaying animal or vegetable matter, even in inconsiderable quantities, is often sufficient to destroy the purity of the water, and so to cause the death of the animals in it; for the poisonous gas, carburetted hydrogen, arising from putrefaction, is there confined within a small space, and the stagnant condition of the water prevents its rapid combination with the oxygen, which, uniting with the hydrogen, produces water, and with the carbon results in carbonic acid. But, in the sea, any dead matter not

consumed by crabs or other scavengers is distributed in every direction as fast as it becomes decomposed and assumes the gaseous form, and a supply of pure water immediately takes its place, so that the plants and animals in the neighbourhood are not exposed to any hurtful influence arising from it, as is the case when the decaying matter gives off its deleterious gases in the motionless water of the aquarium. In large establishments this movement of the water may be produced without much difficulty by the aid of gutta-percha pipes and a small reservoir or supply tank from which the water may flow into the aquarium and the waste be pumped back to continue the circulation; for it is not necessary that the water should be renewed. *Any loss that may take place by evaporation should be made good by the addition of pure fresh water; but the great bulk of the sea-water will last for years if it is kept well aerated; indeed, there is no reason for its ever being unfit for use.* The salts held in solution retain their properties for an indefinite time, as far as is known; and as the pure water is all that is lost by evaporation, that alone requires replenishing in order to preserve the proper specific gravity or density of the whole. In small tanks the water may be temporarily agitated by the use of a convenient kind of force-pump, adopted by Mr. W. A. Lloyd; but unless there is a special supply tank placed on a higher level than the aquarium, so as to ensure a continuous stream, the movement of the water cannot be easily maintained. Prawns and fishes are also useful, to a certain extent, in causing a motion of the water, but they have too little power to produce anything like the continued washing of the sea which the Actiniae are accustomed to; for it will be remembered that these animals, being attached, are exposed to the recoil of the water from the resistance of the rock as well as to the influence of the tidal current; and this double motion of the water produces the wash which gives such a life-like appearance to everything growing within its reach. Animals subjected to this peculiar movement of the sea display a vigour almost unknown in the usually quiet waters of the aquarium. The Actiniae attach themselves firmly in sheltered crevices and expand their flower-like disks to the ever-changing water around them, every wave brings a fresh supply of food within their reach, and their bodies are kept clean by the motion of the water. Fishes, and other swimming animals, also seem to enjoy the continual struggle necessary to prevent their being carried away by the stream, and thus all their vital powers being called into action, everything presents the appearance of health and animation. Such are the results we must endeavour to produce in the aquarium, and we can only do so effectually by imitating, as far as possible, the means employed by Nature. In cases where it is inconvenient or difficult to establish a constant change of water, as in small tanks, great advantage may be derived by occasionally drawing off the water, and in this manner placing the animals in the condition to which they are accustomed when the tide is out. Of course this treatment

is only applicable to those animals and plants naturally living between tide-marks; for, except in the case of some of the blennies, and a few other small fishes, this exposure to the atmosphere is unsuited to the habits of free-swimming animals. The appearance of the Actiniæ, and other soft-bodied creatures, when left thus exposed, is often so unlike their condition, when immersed, as to give rise to the suspicion of their being in an unnatural state; but experience tells us that these animals thrive best when subjected to this periodical exposure, and they show renewed vigour on the subsequent rising of the artificial tide. A great advantage is also gained by returning the water in a small stream to its place in the tank; by this means the whole of it undergoes purification in its passage through the air, and becomes better fitted to support life. We need only take a glance at the rocks at low water to satisfy ourselves that periodical exposure to the atmosphere is almost one of the necessary conditions of life with many species of marine animals. Some of the sea anemones are found so high up in the range of tide that they must necessarily be out of the water for at least six hours of the twelve occupied by its ebb and flow; and if we go lower down and look under the large boulders, and into the dark crevices of the rocks, we shall find a multitude of creatures, and many of them of the most delicate structure, which, for an hour or two in every tide, are quite out of reach of the water. Marine animals can bear this exposure better than the inhabitants of fresh water; the salts held in solution in sea-water retain a moist atmosphere around the bodies of the various animals which have been bathed with it, and evaporation consequently does not take place very rapidly, so that we need not fear imitating Nature even in what, at first sight, appears to be a hazardous proceeding."—*Handbook to the Fish House*, p. 10.

Here we have the principle of the salt-water aquarium clearly explained; and I have, as in one or two previous instances, *italicised* a passage to which I wish particularly to invite attention. Nothing can be more truthful than the entire extract, and it is difficult to conceive anything more neatly expressed than the sentence I have printed in italics; Mr. Holdsworth's method of returning the water into the aquarium is perhaps somewhat superseded by the more energetic operation of the steam-engine, but the idea is the same, and is perfectly in accordance with present practice.

I believe it was during the year following the successful opening at Regent's Park, that the late Dr. Robert Ball introduced a novel mode of aëration at Dublin: this is spoken of as "a method of keeping the sea-water in occasional motion by passing bubbles of air through it from a pair of bellows worked by visitors." I cannot find at this moment any categorical description of the experiment,

or any statement of its success or otherwise; but it is due to the memory of this enthusiastic and kind-hearted naturalist, with whom I had the honour to be personally acquainted, to preserve the record of an ingenious invention.

Again, two years subsequently, in 1856, the Baron Cloquet, whose ingenuity is well known to all the *savans* who took part in establishing the Jardin d'Acclimatation at Paris, revived the use of bellows for the purpose of aëration. His instrument had a gutta-percha pipe fitted to its nozzle, and at the extremity of this a leaden tube, which extended to the bottom of the aquarium; the aperture of the tube was covered with wire-gauze, which pulverized in the most complete manner the air forced through it by the bellows; the emission of the air at the bottom of the aquarium would doubtless partially effect the desired object, but not so thoroughly as Mr. Lloyd's; for on his plan, presently to be described, the air comes in contact with the water, both in its rapid descent and its deliberate ascent, whereas in the baron's method it could only do this in its ascent.

Still subsequently, M. Milne-Edwards the younger, son of the great naturalist of that name, invented an apparatus for aërating an aquarium, the peculiar advantage of which was said to be that it required neither manual labour nor any attention; it is described as working "automatically," thus reminding one of that grand desideratum in mechanics, *perpetual motion*: its figure was that of our old hour-glass, consisting of two chambers connected by what may be called a narrow waist. The upper chamber was full of water, the lower full of air; the water descended by its own gravity from the upper chamber into the lower, expelling the air and driving it into the water of the aquarium, which thus became saturated with air: the operation of emptying the upper chamber took a long time on account of its large size and the smallness of the waist; but when once this was accomplished the entire apparatus swung and reversed itself, in which operation it closed one valve and opened another, and the chamber which *now* contained water being uppermost, the same result took place as before: without seeing the machine I am unable to understand this, so I feel my inability to explain it to others: we all know that under any circumstances the heavy or water-filled chamber would, like a modest gentleman, evince an invincible repugnance to take the uppermost place.

In 1859 Mr. George Hurwood, of Ipswich, contrived an arrangement whereby the pressure of a stream of fresh water, such as exists in the pipes of water-works in towns, or such as can be got from a high cistern already existing in a dwelling-house, may be employed to compress air, which compressed air in turn forces a current of sea-water into an aquarium. This arrangement was adopted by Mr. Lloyd in the Jardin d'Acclimatation, and was eminently successful: it has continued in operation for thirteen years.

The necessity of aëration and motion having been generally admitted, after their introduction in the Zoological Gardens in Regent's Park, other aquariums, more or less fully adopting the principle, were established in the Surrey Zoological Gardens in London, in the Zoological Gardens in Dublin, in Belfast, Galway, Edinburgh, Scarborough, Weymouth, Vienna, and the Crystal Palace; the last named, under the management of Mr. Bartlett, the present invaluable Superintendent of the Zoological Gardens: this was remarkable for the ugliness of its exterior and the extreme beauty and temporary success of its internal arrangement. Others were established in America, and those at Boston and New York became somewhat celebrated—a result, at the latter city, probably due in great measure to the matchless advertising talent of Mr. Barnum. Mr. Lloyd, however, tells us that all these exhibited two faults: the stock of animals was invariably excessive in number, and the animals themselves excessive in size, faults which carried their own punishment, for from this very excess the creatures dwindled and died.

WILLIAM ALFORD LLOYD, the projector of the Crystal Palace Aquarium, and now the Superintendent, and the author of the 'Official Handbook,' was born on the 8th of August, 1828, at No. 6, Bush-lane, Cannon-street, in the City of London, the site now occupied by the premises of Messrs. Barron, Squire and Co., wholesale druggists. He was a weak and sickly child, and at five years of age was sent into Wales for the invigoration of his body and improvement of his mind: he was put to a hedge-school at Llwynlleia, in Merionethshire: the spot thus honoured is equidistant from three villages rejoicing in names which I am totally unable to pronounce, and therefore gladly take refuge in letter-press: these villages are Bettwsygwerfilgoch, Cerrigydruidion and Llanfihangel—names a familiarity with which, Mr. Lloyd tells us,

in his pleasant autobiography, largely assisted his speedy acquisition of the German language in after years. Would that they had the same effect on me! Mr. Lloyd's "school days" might possibly have furnished matter for a narrative as interesting as those of Tom Brown, but he has only given us a very small instalment of such a narrative, and I believe even *that* would have been withheld had it not been for the accidental finding a crab, a circumstance that incidentally leads us to an introduction to his school and school-master in the year 1833.

"I smuggled the crab into the school-room," says Mr. Lloyd, "in order to get the schoolmaster, Humphrey, the learned man of the place, to tell me all about it. He was a little thin old man, with a yellow, shrunken face, yellow teeth, and yellow finger-nails, was dressed in a black velvet coat, waistcoat, and knee-breeches, with black stockings and huge shoes. He knew no English; and at intervals throughout the day smoked very coarse tobacco from a short black pipe in the school-room, which was also the dissenting chapel of the place. There were no writing-desks or tables of any kind, but the scholars knelt on the rubble-floor, and used as desks the deal forms on which the congregation sat on Sundays. Humphrey's scholastic fees were all paid in kind: some of the lads brought corn, or oatmeal, or flour, or wool, or bacon, and I remember once trying to carry on my head *my* payment, a big square lump of coal; but it was too heavy, and another boy kindly let me carry his payment of a lump of butter, and he, being stronger, conveyed my coal. Cheese was a luxury known only to the rich: money was seldom seen in the form of coin, and farthings never. I did not take my crab to school as a matter of payment, nor yet for play or idle curiosity, but really and truly to learn something about it from the only person whom I thought could give me help, and his reply was, 'Ah, William Bach! only learned men in London can give information on such things,' and he smoked his pipe vigorously, and gave me permission to put the crab away during school-time in the chapel pulpit, to be out of the reach of the boys."

In 1837 Mr. Lloyd returned to London, and visited the Zoological Gardens, which proved a constant source of amusement and interest to him whenever he obtained a holiday: this continued for many years, during which his reading and learning, equally sources of instruction and amusement, seemed incessant and most miscellaneous.

In 1838 he obtained the exalted post of errand boy at Messrs. Pontifex and Wood, engineers, of Shoe-lane, and stayed in this place for three years. Unlike any other errand boys whom I have

known, his constant study was to acquire a knowledge of the various mechanical contrivances and combinations which he saw around him. We next find him apprenticed to Messrs. Remnant and Edmonds, the bookbinders, in Lovell's-court: but he was far less assiduous in gaining a knowledge of *that* branch of trade. He was out of his time in 1847, and then, and before, seems to have found opportunity for a most extensive and varied course of reading, and just such reading—deeply instructive reading—as a lad usually pronounces to be “slow” and “dry”; however, he now had reading to his heart's content. The first book he ever bought with his own money was, in 1840, Craik's ‘Pursuit of Knowledge under Difficulties.’ “No written or spoken words,” says Mr. Lloyd, “can express the avidity with which I read Craik's book over and over again, or can tell the encouragement I gained from it.” At the same time he met with a memoir of John Hunter, and was absorbed in admiration of the great anatomist.

“By my reading I was constantly, as it were, brought into contact with him, and learned how he kept at Brompton many living animals in a small menagerie, observing their habits and forms when alive, and dissecting their bodies when dead, and doing so amidst many difficulties. Reaumur and Hüber were two other naturalists of whom I read with mentally wondering eyes.”

But at this time Mr. Lloyd got involved in figures, and the works of Thomas Simpson and James Ferguson, mathematicians, engrossed a principal share of his time, and, stranger still, Augustus de Morgan's ‘Elements of Arithmetic’; thus his attention was diverted for a time from facts to figures; from truths to the expression of truths.

In 1851 he obtained a place in Old-street, at Mr. W. Brown's second-hand book shop, and here, of course, he had an opportunity of indulging his taste for books, and of making his store of knowledge still more extensive: from the ‘Penny Magazine,’ that great source of miscellaneous knowledge, he learned a little of everything.

The 18th of November, 1852, was a public holiday, the funeral of the Duke of Wellington: this memorable day Mr. Lloyd spent in the Zoological Gardens, and here he met with an incident that gave an aquarian tendency to the whole course of his future life.

“On arriving there, near the side entrance, was a building I had never seen before, and which had risen since my last visit—a conservatory-looking

glass erection of not large dimensions, standing on a low wall. The door was fastened, and I could see no one inside, and on my asking of a passing attendant what the place was for, he said it was a 'Fish House,' though some people called it an 'Aquarium,' and that it was destined to contain fish and other such things, even sea-fishes and lobsters, and that it was intended to be opened in the following spring. He added his disbelief in its success and an expression of his sense of the impropriety of its introduction into a zoological garden. * * * *

I went back to the 'fish house,' and passed round to its rear, and there to my great astonishment, I saw through the glass side of the tank containing perfectly clear water, and wonder of wonders, a living pike! I wish I could write what I then felt; I wish I could now feel as I then felt, but such freshness of wonder comes to one not more than half-a-dozen times in a life. I could not get away from the place—it was at the extreme north-east corner of the building, and the tank has been for years converted into a marine one—but I went to it again, and remained there till it began to grow dusk, and it was time to get home. * * * During the last eighteen years in London and Hamburg I have never been without a pet jack in an aquarium."

This seems to have been Mr. Lloyd's first introduction to freshwater captives. I will now introduce both him and my readers to the denizens of the sea: he says that although now (1873) in the Crystal Palace, with all possible means and appliances at his command, he can look back on a time, twenty years ago, when his pence and half-pence had to be laid out with rigid economy, and I am thus introduced to one of the most interesting passages in his life—the search for sea anemones in the streets of London! He had already set up small aquariums in wide-mouthed glass bottles filled with artificial sea-water, but these miniature establishments were without living inhabitants: his *modus operandi* for supplying this want is thus described:—

"I used to sally forth at dead of night, where heaps of oyster-shells were thrown by day from street oyster-stalls, in Smithfield and St. John's-street, and bring them home. The oysters devoured in such poor neighbourhoods are not the genteel little smooth 'natives' eaten at luncheon-bars, but big, rough commoners with bold foliations on the upper shell, and deeply ribbed on the lower one; and in and below these hiding-places I could find many little sea anemones of several species, some hopelessly smashed, but others quite perfect, having been protected by the strong projections of the oyster-shell and unharmed by rain or other fresh water. The species I found thus were *Actinoloba Dianthus*, *Sagartia viduata*, *S. Troglodytes*, *S. Bellis*, *S. elegans*, and, but very seldom, *Actinia Mesembryanthemum*. All these

I used to pick off the shells with never-wearying patience and care, and drop them into the fictitious sea-water and transfer them to my bottle, to which they adhered and made themselves happy. I used to feed them with little morsels of oyster-flesh which I found adhering to the inside of the shells, and when the water would become offensive from the effects of the food, because the quantity of fluid was too small to hold enough oxygen in solution to decompose the dead animal matter fast enough, I poured the water from the little bottles into a great earthenware foot-pan covered with a sheet of glass to keep out dust, and standing in a dark corner of the room. The foot-pan was so very large in comparison with my small bottles that the emptying of them periodically into the pan did not interfere with the water in the latter, so that from it I immediately refilled the bottles, one at a time on successive days. The water in the foot-pan on the floor thus effectually counteracted all tendency at going wrong in the bottles on the window-sill above."

Two years after this, namely, in 1854, Mr. Lloyd sent me two short papers for the 'Zoologist,' which show that his love for sea things continued in all its force. These exhibit beyond all question the deep, and I may almost say, the devout attention, with which he studied Nature at this period: his "Note on the Habits of *Limnea stagnalis*" (Zool. 4248) is a master-piece of descriptive writing. Of course I was anxious to know such a man, and in March, 1855, I found him located at 164, St. John-street-road, in company with poverty and sea anemones, sacrificing all worldly considerations to a love of Science. Other papers soon followed, intitled severally "Occurrence of *Edwardsia vestita* in Britain" (Zool. 5180) and "Note on a Sea-Cucumber in Confinement" (Zool. 5181). These exhibit in an especial degree three great qualifications of a naturalist—1st, the knowledge which leads to the instant selection of what is peculiarly worthy of observation; 2ndly, the faculty of observing systematically, or in the words of De la Beche, the knowledge "how to observe"; and 3rdly, the power of defining the observations: these qualities Mr. Lloyd possessed and possesses in an eminent degree. I have never forgotten, and hope never to forget, that first visit to the *great* aquarian and the appearance of his *little* aquariums; glass bottles or cylindrical vessels, some on the table, some on the window-sill, some in the dark, some in the light,—all contributing to his already large stock of knowledge, all revealing secrets previously hidden.

In 1856 he removed to Portland-road, and embarked in business; as a matter of course, the aquarium business,—and almost also as

a matter of course, unsuccessfully; he was not cut out for business on his own account; he had no skill in buying and selling; but his reputation as an aquarian was established, and in 1859 he was summoned to Paris, and undertook the management of the aquarium in the Jardin d'Acclimatation.

In 1862 I find Mr. Lloyd again in London, exhibiting an aquarium, worked by compressed air, at the International of 1862, and accompanying the exhibition by the publication of a very clear and compendious account of the principle and construction of aquariums in general and of the Exhibition aquarium in particular.

While thus occupied he was visited by Dr. H. A. Meyer, who was desirous of establishing an aquarium at Hamburg, and this finally led to an arrangement with Baron Merck for Mr. Lloyd's removal to that city and the construction of an aquarium in the Zoological Gardens there, under his sole superintendence: this was opened in the spring of 1864, and soon became eminently popular as well as successful in a pecuniary point of view; the names of the late Dr. Meyer, Professor Mobius, Chief-Justice Schwartz, and the late Baron Ernst von Merck must always be associated with that of Mr. Lloyd in this admirably managed establishment. The sea-water is circulated partly by a water-pressure engine set in motion by the town water-works, which drive a pair of water-pumps (instead of compressing air as was done in Paris), and partly by a steam engine which drives two other pumps.

"The great pecuniary success of the Hamburg Aquarium caused other aquariums to be erected in various parts of the Continent, namely, in Hanover and at Boulogne-sur-Mer, in 1866; in the Boulevard Montmartre in Paris, in 1867; in the Reserved Park of the Paris International Exhibition, in the same year, in two places; twice at Havre in 1867 and 1869; in the Zoological Gardens at Brussels, in 1868; in the Flora Gardens at Boulogne, in 1869; and in Berlin, in 1869."—*Official Handbook*, p. 20.

I do not mention these dozen aquariums as under Mr. Lloyd's superintendence, but as called into existence by his successful management at Hamburg and elsewhere. In 1870 he returned to London, at the summons of the "Crystal Palace Aquarium Company," and there he is located at present, and I trust bids fair to become a fixture. And here it is indispensable that I mention that since the Crystal Palace Aquarium was opened two others (at Copenhagen and Brighton) have been completed; five more (at

Vienna, Manchester, Southport, San Francisco and Naples) have been commenced; and still three others (at Frankfort, Birkenhead and Rothesay) are partially erected.

We will now enter the Crystal Palace Aquarium, Guide-book in hand, or rather 'Zoologist' in hand, for I am indebted to the courtesy of the Crystal Palace Company for the use of their stereotype plan of the aquarium, which explains the details. I *fear* I have been a long time in reaching this point, but I *hope* I have spent that time pleasantly and advantageously; and thus between fear and hope, the two great ingredients of human life, I also enter a restricted passage, which is not without its dangers:

"Contra, jussa monent Heleni, Scyllam atque Charybdim
Intra utramque viam, leti discrimine parvo,
Ni teneant cursus."

Æneid, book iii. line 684.

The prosy style is my Scylla, the florid my Charybdis; I will try to steer between them.

The plan of the aquarium is shown by the plate: in round numbers, it is 400 feet long and 70 feet broad. It is only one story high, and this ground-plan exhibits everything that requires explanation, except a reservoir, which is under ground, and contains 100,000 gallons of sea-water, kept in the dark. On the subject of keeping a very large proportion of the water in the dark a great deal has been said by Mr. E. Edwards, formerly of Menai and now of Chester, Mr. Warrington, of London, and Mr. Lloyd. Various contrivances have been tried for keeping a portion of the water of aquariums thus in the dark, on the plea that but little light can penetrate the ocean, a fact strongly supported by the fact that the deep-sea animals are frequently without eyes, or at least without eyes that we are accustomed to consider as such, thus showing that vision is neither required nor possessed at great depths below the surface: on this subject I cannot forbear to quote Mr. Warrington.

"When the rays of light strike the glassy surface of the water, the greater part of them are reflected, and those which penetrate are refracted and twisted in various directions by currents of the water; and when the depths are considerable it would be few rays that would penetrate to the bottom; but let the surface become ruffled by the passing wind, and it is little light that can be transmitted; and when the same disturbing cause lashes into waves and foam, not a ray can pass, and all below must be dark as night."—*Zool.* 5702.

The great bulk of water in the ocean being then in its "dark unfathomed caves," the plan of keeping it dark in an aquarium is obviously little more than a direct obedience to the teachings of Nature, and there is little necessity for explaining the principles which require, or the circumstances which accompany, profound darkness. Sea-water constantly exposed to light is apt to become opaque and of a greenish brown colour—a very serious evil in a public aquarium. The darkened tank extends under the floor of the aquarium from end to end (*i. e.* beneath G, G, F, &c., in the plan) and also under the compartments marked 9 and 10. It is no part of Mr. Lloyd's design to change or renew this vast bulk of water, but it will become necessary to add from time to time a portion of distilled *fresh* water to compensate for the waste which must inevitably result from evaporation, leakage of pipes, or breakage of glass, this last being a calamity to which all such establishments are unfortunately subject.

Keeping the plan still in hand, the compartments or pigeon-holes, representing tanks, are numbered 39 to 60, 1 to 18 A, 38 to 28, and 27 to 19, are also filled with water, and contain altogether no less than 20,000 gallons, in which the living objects of the aquarium constantly reside, and all of which are lighted from above, nineteen of them having in addition one side (that fronting the area, G G) of plate-glass, by which means additional light can penetrate the water and illuminate the objects living therein. Thus the entire quantity of water is 120,000 gallons, of which five-sixths is in the dark and one-sixth in the light. This large quantity of water is kept in constant circulation; a steam engine of three-horse power (M) and one of Forbes' patent vulcanite pumps (N) work day and night to raise water from the dark reservoir (G G F) and discharge it into the light reservoirs 9 and 10, at the rate of from 5000 to 7000 gallons per hour.

This engine and pump are necessarily in duplicate, because if either should break down through any unforeseen casualty, the motion of the water would be arrested and the lives of the prisoners jeopardized; indeed, so dependent are these on this sea-like movement of the water, that the stoppage of a pump for a single hour has produced visible effects on their health and spirits. These pumps and engines necessitate the employment of three engine-men, and these relieve each other every eight hours, so that *one* is always on duty. The exigencies of the animals also necessitate the

employment of three other attendants, and I can bear my willing testimony to the great intelligence and unvarying civility of those now employed.

The pumped-up water flows, as I have said, into tanks 9 and 10, half into each; the stream pumped into tank 10 passes to the right,—an aperture having been purposely left in each party wall, as these divisions might be called,—into No. 11, thence into No. 12, and so on until it reaches No. 18 A; here it passes beneath the corridor or pathway (J J J), called the “Attendant’s Gallery” in the “Key to Plan,” and flows into tank 60; thence it turns to the left, through an earthenware pipe, into tank 59, and so on through tanks 58, 57, 56, 55, 54, 53, 52, 51 and 50, into tank 49, where it falls through a cylinder into the dark tank below. A second stream, also pumped up from below, falls into tank 9, and thence passes to the left into tank 8, and thence into tanks 7, 6, 5, 4, 3, 2 and 1, whence it crosses under the corridor (J) into tank 39, and then turning to the right through tanks 40, 41, 42, 43, 44, 45, 46, 47 and 48, finally plunges into the cylinder in tank 49, and there, uniting with the stream I have traced from the right hand, returns to the great abyss below, thence again to be pumped up, when its turn shall arrive, into tanks 9 and 10, and pursue the same course as before. The arrows in the plan show the direction which the stream is continually taking. The animals in the tanks numbered 1 to 18 A are intended to be viewed laterally from the saloon (G G F). I have already explained that the sides of these tanks facing the saloon are of plate-glass, and therefore the animals can be seen as perfectly as if you were in the sea in a transparent diving-bell: the other row of tanks 39 to 60, is intended for reserves, not open to public inspection: this reserve is very necessary, as casualties by death must of necessity occur now and then: all these forty tanks are on the left or west side of the saloon which is entirely devoted to the public. On the east of the saloon are two apartments (H and I) containing respectively nine and eleven tanks; the whole of these tanks, numbered 19 to 38 inclusive, are very shallow, open at the top, and of a convenient height for viewing the animals vertically, or dorsally, for that is a better term, since we look down on their backs. The water is here circulated much in the manner I have described in those on the west side of the saloon, but the stream is smaller and less rapid: it passes under the floor of the saloon in both instances, into apartment H by means

of an invisible pipe B 2, and into apartment 1 by means of an invisible pipe c 2. The flow of the water after being pumped into tanks 9 and 10 is caused simply by gravitation, there being a fall of from three to six inches from tank to tank; thus in tanks 9 and 10 the water stands at a height of six feet, while in tanks 1 and 18 A it is only three feet. Yet this constant flow Mr. Lloyd considers still insufficient for the supply of oxygen to all the inmates; he has therefore arranged a number of small pipes, one for each tank, with a nipple nearly touching the surface of the water, and through each of these water is forced in a small but powerful stream: in its short passage between the nipple and the surface of the water each of these streams entangles and incorporates a great quantity of air, so that myriads of bubbles of air are driven with great force, but in a state of subdivision so fine as to resemble steam or falling sand, almost or quite to the bottom of each tank, whence they return and reascend to the surface with a gentle and deliberate movement strangely contrasting with the violence of the descent. This forcing in of the air corresponds as nearly as possible with what takes place in the ocean when lashed into foam by the violence of the winds; the waves tumbling tumultuously one over another entangle and carry with them by their proverbial violence a vast quantity of air, which, after being dashed downwards, again rises to the surface, having discharged its office of communicating purity to the water and life-supporting breath to its inhabitants.

It appears from a paragraph at page 9 of Mr. Lloyd's 'Hand-book,' that he places more reliance on the effects of vegetation than his admirable arrangements for aëration and circulation, just described and explained, would have led us to suppose; nevertheless "if all the necessary vegetation of the Crystal Palace Aquarium could be gathered together, it would, when deprived of water, probably not weigh one ounce": these are Mr. Lloyd's own words; but the passage to which I desire to invite attention is the following:—

"Towards the close of the [last] century, namely in 1790, the late Sir John Graham Dalyell began to keep living marine animals for observation, in his house in Edinburgh; and continued this practice till his death, about 1850; but he changed the sea-water two or three times a week, though some of the animals lived for eight or ten years; and one sea anemone (*Actinia Mesembryanthemum*), taken by him from the sea in

August, 1828, is still alive and well. But Sir John knew nothing of employing plants to evolve oxygen, and therefore to preserve a balance of life with unchanged water, though Dr. Joseph Priestley (1733—1804), the discoverer of oxygen gas, and the first observer of the fact that that gas is emitted by plants under the influence of light, and therefore the earliest enunciator of the main principle on which the maintenance of aquariums depends, had published this discovery and observations. Ingenhousz also had shown that plants evolved this gas. Therefore if Dalyell knew this, he did not apply the principle.”—‘*Handbook*,’ p. 9.

However, I have a widely different object in introducing this notice of Sir John’s aquariums and their success. Mr. Lloyd, who never leaves a stone unturned if there be a chance of finding a particle of information beneath it, obtained access to Sir John’s quartos,* with a view of ascertaining his practice, his experience, and his views, at a period when this now engrossing subject was almost totally ignored; but in doing so he found explanations that required explaining. Miss Dalyell, a sister of the Baronet, was then still living in Edinburgh, and, although at the advanced age of nearly a hundred years, was in full possession of her faculties and her memory: he therefore conceived the idea of framing a series of questions on those points which appeared obscure, and of respectfully soliciting information. It was indeed a bold step, but a successful one. To these questions Miss Dalyell most obligingly sent the following categorical replies, which cannot fail to be read with the deepest interest. My sincere thanks are due to Mr. Lloyd for having, unsolicited and unreservedly, placed these letters in my hands for the express purpose of illustrating this notice of his ‘*Handbook*.’ Miss Dalyell’s replies evince a wonderful retention of faculties to extreme old age, but also prove what an observant and intelligent interest she must have taken, during very many years, in her brother’s scientific pursuits.

LETTER I.

Miss E. Dalyell to Mr. W. A. Lloyd.

8, St. Colme Street, 2 January, 1860.

SIR,—In answer to your enquiries regarding the way Sir John Graham Dalyell kept his marine animals, I will certainly give you all the information

* ‘Rare and Remarkable Animals of Scotland.’ By Sir John Graham Dalyell, Bart. 2 vols. 4to, 1847—8. And ‘The Powers of the Creator displayed in the Creation.’ Same author. 3 vols. 4to, 1851—8.

I possibly can, by in the first place telling you the vessels containing them were all made of the very finest, clearest glass, wide at the top, just the same width as at the bottom: they were invariably round, and all sizes, some short, some long, some wider, some not so wide.

I cannot remember ever seeing more than one fine specimen in one glass; no marine plant whatever was in the water where the animals dwelt. Sir John fed them himself; what he gave them I do not exactly know, but raw mussel I know was one thing: he kept many of his subjects eight and ten years alive. He was most particular in giving them sea-water always out of the sea, when it was *flowing*: he changed the water every morning, often twice a day, if he perceived the smallest fragment amongst it, wiping and washing the glasses very clean. He got sea-water always twice a week, and sometimes three times; it was carried in an earthenware jar holding about three or four gallons of water: a person was specially employed for the purpose.

Sir John's subjects were always kept on a shelf under the window of his study; it was situated in the north out-look; whether they were put there for any purpose I don't know, but I think it was just to put them anywhere out of the way; sometimes he had a fire in his study and sometimes none. He understood nothing of Marine Botany; his chief aim was water fresh from the sea, when it was flowing and full of animalculæ, and particularly clean vessels. If I can give you any more information upon the subject I will be happy to do it.

I remain your obt. Serv^t.

E. DALYELL.

LETTER II.

Miss E. Dalyell to Mr. W. A. Lloyd.

8, St. Colme Street, 4 February, 1860.

SIR,—Your letter of the 18th of January reached me, but it being a difficult task for me to perform furnishing you with dates, I am sorry to say I am unable to perform it further than to mention, the first aquatic subject I found was dated in the year 1790, and as a curiosity I desired it to be engraved upon one of the copper-plates. It is the *river worm* which forms into a little fly. As you have the work, you will observe a little fly and beside it a black little worm; the worm ought to have been of the most brilliant scarlet colour. I know as to the *Hydratuba*, Sir John was busily engaged about experimenting upon it in the years 1800 and 1808. This is all the information I can give you. I know very well *once* every subject was dated, but where these dates are now I cannot tell.

I am, Sir,

Your obt. Serv^t.

E. DALYELL.

Here then I conclude my observations on aquariums and arrangements for their maintenance. I have in reserve sundry notes as to their inhabitants, which are perhaps rather more in my way. I confess to feeling a greater interest in living beings than in the mechanical arrangements for their benefit. Still I shall do my best to explain should explanation be required at my hands, and shall only be too happy to receive questions that I can answer.

I should also like to add that although I have mentioned only one 'Handbook,' it is because I knew of only one when I commenced this notice. Since then I have received a second, the 'Official Guide Book to the Brighton Aquarium,' by W. Saville Kent, F.L.S., F.Z.S. It is a pleasant and readable account of that magnificent building, and I hope to return to it again and again. In the mean time I would impress on the compilers of these books the value of simplicity. They themselves luxuriate, aye revel, in technicalities and what is called the language of Science; but they must not on this account hope to inspire the general public with the same refined taste. Visitors to these aquariums are for the most part, like myself, "out for a holiday." On such occasions we do not absolutely abjure the idea of receiving instruction from books, but neither are we disposed to expend much labour in the pursuit of knowledge.

EDWARD NEWMAN.

Natural-History Notes from Honolulu.

By GERVASE F. MATHEW, Esq., R.N., F.L.S.*

BIRDS of all descriptions are very scarce here. We have now been a fortnight at anchor, and during that period I have not seen a single example of any kind of gull or tern, and only two petrels—a small black fork-tailed species and a large gray white-browed fellow; also one or two tropic birds flying high overhead. On shore I have noticed three kinds of thick-billed finches, a large gray night heron, and a species of long-tailed dove. The latter is common in gardens and shrubberies in the town itself, and is said to have been introduced; but I am not certain on this point, as the bird is common throughout the country. The nest is a very loose, open affair, composed of twigs, and one I found contained two young. Minah birds, imported from India, have increased

* Kindly communicated by his brother, the Rev. Murray A. Mathew.

rapidly, and are now plentiful: they are most impudent birds, possessing the habits of the starling. I have on several occasions seen them feeding together in flocks, and at such times they fight and squabble most vociferously: usually they feed in pairs, or at least they do so at this time of the year. These birds are dark plumaged, with a large white patch on the wings, yellowish legs and beaks, and bare skin round the eyes. I was offered a nest of young one day by a native: the nest appeared to be loose and composed of dry bents. Ducks are numerous; I shot several one morning early: they are a trifle larger than our wigeon; plumage something like female common duck, but the feathers of breast are deeply bordered with cinnamon-red; the beak is somewhat broad and soft. I found them breeding, or should have shot more.

Inland, among the mountains, there are numbers of wild turkeys, pea-fowl, fowls and Californian quail, the produce of birds that have been turned down. One day I was out I saw an Australian piping crow; it passed close to me, and there was no mistaking it: I suppose it had escaped or been let loose. In the winter season, I am told, there are many visitors to these islands, such as the "northern duck,"—whatever that may be,—and two sorts of plover, probably a golden and gray, similar to those I may have seen on the coast of Peru.

With reference to Mr. Howard Saunders' notes you enclosed, the blackheaded gull he mentions as being similar to our *Larus ridibundus* is a much more interesting species when in full plumage, as they were when last I saw them. Their legs were then bright coral-red; beak the same, shaded with black towards the tip; head *intensely* black, with a broad white ring round the eyes.

At Callao, in April, I noticed a brown-, or nearly black-, headed gull as large as our common gull, with flesh-coloured legs and orange and black beak, but none were in good plumage. I am sorry to say I skinned but one bird at Callao, and that is an almost black skua, without any long tail-feathers. I was so much occupied with butterflies, I had but little time for birds; moreover, you cannot imagine what obstacles there are in the way of skinning on board a man-of-war, especially in the tropics, where a bird begins to smell almost as soon as shot. There were at least four or five different kinds of skuas at Callao, and they were continually harassing the poor gulls.

I saw on the coasts of Chili and Peru four kinds of terns, possibly more. The most common occurred at Coquimbo, and was a very long-winged species, with a black crown; a large species, too, was pretty numerous.

Scissors-bills were abundant at Callao, and fly chiefly at dusk and in flocks: I killed five at a shot one evening.

I will keep a look out for the "deeply forked-tailed gull" at Vancouver; if it is an arctic species it may turn up there. I observed a very pretty gull at Payta, and only at that place: it was of a beautiful pale blue on upper surface and pure white beneath, with deep *orange-red* legs and beak: I should certainly have obtained one if I had not been so seedy, for it was a peculiarly interesting and delicate species.

I wish you could see this island; it is a perfect paradise, it is so beautiful. It is all alike, and almost impossible to describe; at least, with my poor powers of description, I could never do justice to it. The island is split up, as it were, into a succession of deep ravines, running east and west. The sides of these rise to mountain peaks, clothed to their summits with the greenest verdure of strange and unknown trees. Here and there, in the valleys, the trees disappear, and are replaced by park-land of the richest turf, with occasional clumps of flowering shrubs to add beauty to the scenery. In some places cascades rush foaming down the sides of these gorges, their track being marked by a margin of lovely ferns. * * * It is a magnificent sight going on shore watching the huge rollers galloping towards the reefs, and breaking with a thundering noise as they tumble over into the smooth water beyond. I took a walk one afternoon on the beach, in hopes of getting some shells, but I saw nothing worth picking up. The only interesting things were the crabs, which were very long-legged and amusing, and ran at a tremendous pace.

Some of the little black-headed gulls on the coast of Peru have the breast tinged with salmon-colour, like the roseate tern: these are, I expect, the old birds, and this charming colour is probably lost after death.

GERVASE F. MATHEW.

H.M.S. 'Repulse,' Honolulu, Sandwich Islands,
June 25, 1873.

Notes on the Fauna of Spitsbergen.

By the Rev. A. E. EATON, M.A., Memb. Ent. Soc. Lond.

IN arranging for his third voyage to the Arctic Regions, Mr. B. Leigh Smith invited three of his friends to accompany him in the steam yacht 'Diana,'—Mr. T. B. Potter, Lieut. H. C. Chermiside, R.E., and myself. It was his intention to carry relief to the Swedish Expedition on board the 'Polhen' (H.S.M.S.), which, as he conjectured, had been beset last fall in Mossel Bay, and then to continue his explorations. We arranged the conduct of the business of the expedition in the following manner. Mr. Chermiside made the surveys, and kept such meteorological observations as he deemed expedient: he also superintended the photography, in which he was assisted by Mr. Smith and Mr. Potter. All three of them zealously devoted themselves to the *cultus* of our mythological patroness, and left to my care the miscellany of Natural History. My best opportunities for collecting on shore occurred when the others were away deer-stalking. On these occasions I usually went unarmed, preferring the chance of being able to drive off with stones any bear that might attempt to make a friendly advance upon me, to the certainty of being overloaded through the addition of a gun and ammunition to the tins, hammers, chisels, bottles, bag, boxes and alpenstock, which had to be disposed somewhere about me. Sometimes, however, in very bearish localities, one of the hands would be sent with a rifle to guard me; and dull work it must have been to him to be kept loitering about while such numbers of stones were being turned over, for not a bear was forthcoming. An alpenstock, I may observe, is a most serviceable implement to an arctic or alpine collector; for, in addition to its utility in cliff-climbing and on snow slopes, its spike is an excellent substitute for a trowel for rooting up plants, and serves admirably as a fitting for the socket of an ordinary ring-net. For a long time I have used no other stick than an alpenstock for my net in Switzerland.

At the recommendation of Mr. J. G. Jeffreys, I provided two naturalist's dredges of the usual make and size (*i. e.* about twenty-four and thirty-two pounds weight a-piece); and Mr. Jeffreys very kindly lent me a proper net for the smaller of them. But as no less than a whale-line and all hands were required for the working

of the smaller dredge, no pulley being employed in hauling it up, these dredges were voted too heavy, and recourse was had to a large-meshed oyster-dredge and a swab. It will be seen that we did get a few of the peculiarly arctic shells, even with this apparatus.

We left Dundee on the 10th of May, and re-entered the docks on the morning of the 27th of September. As a moderately accurate account of our voyage is given in 'The Times' of the 29th September, I shall not here reiterate our course, but shall merely note a few incidents connected with it which do not relate to Spitsbergen, and therefore cannot be touched upon in the systematic portion of this paper.

On the 25th of May, when we were about lat. $74^{\circ} 12' N.$, long. $1^{\circ} 45' W.$, a flight of snow buntings passed us flying westwards, the surface wind being N.E. Not far from the same neighbourhood, in lat. $74^{\circ} 28' N.$, long. $2^{\circ} 8' W.$, I procured some pieces of decayed ice discoloured by diatoms: these plants grew on the surface of the ice-crystals in the interstices of the honeycombed part, and there formed a coloured layer between the newer snow and the hard ice from four inches to two feet in depth. A piece of clearer ice contained one or two fragments of comminuted pine-bark about a sixteenth of an inch in length, and a bird-louse, which afforded much amusement to the sailors when viewed through a Coddington lens. I also picked up a short piece of *Fucus vesiculosus*, in very fair condition. The day after (27th May) a male redpoll alighted on the ship when we were in lat. $75^{\circ} 13' N.$, $2^{\circ} 30' W.$ It was seen by several of the crew, but while attempts were being made to secure it, resuming its course it flew far away out of sight. Three flights of snow buntings, eleven birds in all, flew past us westward the next day. On 29th May we saw the first narwhal, in lat. $76^{\circ} 39' N.$ I had obtained from the master, Capt. Fairweather, a few days before, the following account of the occurrence of a female narwhal, with a tusk nine feet and a half long, which had come under his own observation. He described the circumstances of its capture nearly in the following words:—"In June month, 1863, a unicorn was struck in Melville's Bay, by the 'Wildfire,' commanded by Captain Walker. The harpoon drew and they lost the fish; but it was afterwards picked up dead by the 'Day,' of which I was mate. When they were flensing it my attention was attracted by something unusual in its appearance, so

I ripped it up, and discovered what the Swedes would call a '*foster*.' This was eaten by the men with great relish. The she unicorn had a horn nine and a half feet long." Our first mate, Mr. James Cumming, of Dundee, was mate of the '*Wildfire*' that same year. He recollects the circumstances perfectly, and fully corroborated Capt. Fairweather's statements; so also does Capt. Walker. All applications for further testimony should be addressed to the men who participated in the feast; if they cannot recollect it, they ought to.

In the night of 30th May a small patch of seals was descried on an ice-point ahead of us. The *battue* was postponed until the morning, it being found that seals are less inclined to take to the water in the forenoon than they are at other times of the day. It was nearly eight o'clock when the boats put off from the ship. From the crow's nest the seals could be seen upon a strip of distant ice, a body about two miles long and a few hundred yards wide. They were not distributed over all this area evenly, but were in very irregular order, like a flock of sheep grouped loosely along a road beneath the shade of straggling trees. All of them were lifting up their heads at intervals to sniff the air, seal-fashion, and when the boats, mistaking the direction, bore down upon them from the windward, they began to get uneasy. Most of them, however, satisfied themselves with an occasional glance at the ship, and having reassured themselves that she was still two or three miles off, determined not to budge just yet for anybody. The boats, however, were getting almost within range, and the nearer seals at last began to think that matters were getting serious, so one or two hundred of them shuffled off the ice and plunged into the water, like boys foundered in a sack race. The rest remained upon the ice until the men got within fifty or sixty yards of them, and, taking the groups in detail, shot one or two out of every patch. At the first shot the nearest unwounded wriggled rapidly off the hummocks into the water, and not unfrequently the dead would perversely follow their lead and sink before they could be secured. If they did not, they were flensed at once where they lay, the skins were thrown into the boat, and then the men made for another patch. When the boats returned we stood away to the next point, where we again fell in with the old saddle-backs (*Pagophilus grænlandicus*), and they were in larger numbers than before. There must have been many thousands of them, for they covered a strip

of ice over two miles in length as thickly as a flock of rooks a pasture. But the men had less sport, because a "Dutchman" came up and hurried our movements. All foreign vessels are called Dutchmen in whaler's parlance; this was a Norwegian smack. It is said that some of our bullets screamed over the heads of her boat's crew when they got among the seals, and I partly believe it, for our men were not very particular as to what might be beyond the mark they fired at, as some of us can personally vouch for; besides which the Norwegians were a good way off, and not in sight, for nobody can see far over hummocky ice. The sea in this neighbourhood was discoloured with a dark bottle-green Algal, which afforded food to myriads of a *Cetochilus*, and had an unpleasant smell. The little entomostracan could be obtained in any quantity by sinking a towing-net a few fathoms below the surface when the ship was hove to.

On the 2nd July we reached Treurenberg Bay with Mr. Smith's yacht, the 'Samson,' in tow. We had met her between Low Island and the Seven Islands, near the ice edge, the day before. Amongst the pitch-pine and spruce drift-wood on the shore of this bay one of her men picked up a fisherman's glass net-float, which the officers of the Swedish expedition were of opinion could only have got there by being drifted from the Loffoden Islands. The 'Polhen' unexpectedly arrived in the night of the 3rd July, and we had the pleasure of receiving a midnight visit from Prof. Nordenskiöld and Capt. Pallander, R.S.N. When we returned their visit the next day, they gave us an account of their adventures during their two months' absence from the ship. Leaving Mossel Bay early in April, they had crossed over to the other side of Hinlopen's Straits, near Shoal Point. Here one of their men, soon after their landing, went a little distance along the shore to search for drift-wood for a fire, was lost in the fog, and was never seen again. This was the only death amongst the men belonging to the Swedish expedition during the whole of their voyage. They proceeded to Phipps's Island, intending to sledge northwards from it, the Swedish expedition in 1863 having reported the ice to have been in very good condition for sledging that season. This year it was hummocky instead of level, and altogether unfit for sledging, so they left their boat on the island, and took with them a sledge to carry their provisions on. From Phipps's Island they crossed over to Cape Platen, and thence proceeded along the coast of North-East Land

to within a few miles of Cape Leigh Smith. They then turned inland southwards, and endeavoured to reach Cape Moen over an elevated tract of undulating table-land. Soon after their start one of the men was almost lost in a crevasse, being kept up by only one arm passed through his rueraddy (sledge-trace); so they provided all hands with two rueraddies apiece, and these sufficed to keep them from falling through the snow. But as they advanced towards the opposite coast, the glaciers became so much broken up that at last they determined to turn westward and leave Cape Moen alone. For very many days they were unable to see anything but an unvaried expanse of snow so similar to the floes that the first glimpse of a bare mountain peak protruding above it caused the man who viewed it to call out "I see land!" On fifty days out of the sixty of their absence from the ship it snowed. They returned in safety to Mossel Bay two or three days after our first visit there.

Having disposed of all that is foreign to the title of my paper, I will proceed to make some observations on the Vertebrates of Spitsbergen.

MAMMALS.

Man.—There must be many hundreds, if not thousands, of men buried in Spitsbergen. The graves are usually situated on a knoll or a low ridge near a harbour; and it sometimes happens that they are found in good order. Here and there along the coast a solitary grave may be met with close to the beach; but, as a rule, they are on higher ground. Their positions are various, not always by any means east and west. A large proportion of them have collapsed, either through the subsidence of the stones piled up over the corpse, or in consequence of foxes having burrowed into them; and portions of skeletons are disclosed in the gaping coffin, protrude between the rocks, and are plentifully scattered over the surrounding soil. Sometimes the wood of the coffin has been used for fuel, and the rarity of anything resembling a wooden cross from graves dug (as many of them must have been) by Catholics of the Eastern Church is perhaps to be accounted for on the same grounds. On the 8th of September I was returning to the ship along the southern side of Green Harbour with our second engineer, James Kidd. The object of our walk had been fossils and plants, and we had met with moderate success. While we were looking after a patch of *Nardosmia alpina*, which we had found a

few hours before, a round white object on the ground a hundred yards away attracted our notice. As it could not well be a quartz boulder on that slope, I went back to see what it might be. It was a human skull. Beside it was a scapula and part of a rib, together with the lower jaw and some loose teeth. Where the breast had been were scattered leaves of metallic tablets impressed with effigies of saints and some words in Russian, and there were remnants of the rosary to which it had apparently been attached. An empty powder-horn was close at hand, marked with a small cross cut out with a knife: these articles I preserved. The bones I carefully gathered together, and committed to the ground with such words of the English Office for the Burial of the Dead as time permitted me to use; and then we left the grave and returned to the ship.

Ursus maritimus.—We had several opportunities of watching bears on the ice. They were in most cases too distant from the ship to be molested, and so we could observe them through telescopes at our leisure, and learn something of their natural habits. They can rarely be detected when they are not moving. Dirty pieces of ice attract little notice; so do the bears, which resemble them in colour, so long as they keep still; but when they start upon their travels they become conspicuous objects. They stride along leisurely, with so even a gait that the eye, deceived by the ease of their movements, can hardly realize the rapidity of their progress over the floe. We could see them catch seals sometimes. One bear, sauntering along, walked up to his seal and took hold of it without any formality whatever; another caught his dinner by suddenly pouncing upon it; another dragged himself over the ice with his fore paws, like a dog scraping itself along the ground, and executed a regular stalk. Off Low Island a bear sat down upon its hams to admire the ship and give itself a thorough scratching with its fore paws, like a lively Esquimaux. I did not find ticks upon the skins of any of those which were shot. It is the fashion in the Greenland Sea to believe nothing which anyone of another ship than your own may please to tell you: our men observed this custom pretty strictly; and there were some things in which we began to be disposed to adopt a similar principle. One of these things was arctic literature. Whenever the tedium of a foggy day had to be relieved, the sufferer had recourse to some work on arctic exploration. Talk of the effect of “*extractum carnis*” on a

starving man, it is nothing beside the effects which such extracts from books as "Terrific Encounter with a Polar Bear," or "The unparalleled Ferocity of the Lion of the North," have when skillfully administered to a sufferer from *ennui* in Spitsbergen latitudes. Instead of raging monsters capable of receiving with pleasure some dozens of bullets and lance-thrusts, and coming up again for more, modern polar bears are quite ready to die if they get only one. The last thirty years must have worked a wonderful change in their constitution. The first that was killed by us tried to escape when she saw the boat approaching. Lieut. Chermside had shot a walrus on his way to Table Island, and in returning the bear was seen beside the krang. When the boat came near she seemed undetermined whether to make a stand or to retreat; deciding at length upon the latter course, and seeing that the water offered the safest route, she deliberately stepped backwards, and carefully let herself down into it: she had not gone far, however, before she returned to the ice she had left. Clambering up again, she crouched down at the water's edge facing the boat: one bullet through the ribs from Mr. Chermside's rifle, and the ferocious beast "went off as quiet as a lamb." *Ex uno disce omnes*. I can speak without prejudice on this subject, for I have never fired at a bear in my life.

Canis lupus.—On the morning of the 29th of June we were made fast to the floe between Walden and Parry's Islands, when an animal was seen ranging over the hummocks at some little distance from the ship. Our skiemán, Jeffreys, went up to the crow's nest and watched it for a long time through the ship's glass. He described it as being as large as a Newfoundland dog, and in colour black with white spots. He has no doubt of its being a wolf. As he kept a wolf last year on a ship in the Straits, his opinion as to the identity of the animal before him on this occasion carries some weight with it. The Swedes told me after this that they also saw at the Seven Islands what they took to be a wolf. Again, in August, Lieut. Chermside and I came across a track in the snow on Phipps's Island, one of the best-marked footprints in which measured five inches by three. Capt. Walker, of the 'Samson,' also, both in May and in August, found in a valley at the head of Magdalena Bay, some very large foot-prints in the snow; and he says that nobody could persuade him that they were not wolf-tracks. He tried to trap the animal, but the burgomasters persisted in getting caught

instead. Neither he nor the skieman were aware before I told them that no wolf has ever been killed in Spitsbergen.

Canis lagopus.—We met with black foxes in several localities; one at Fair Haven, another in Wiide Bay (which was chasing a hen ptarmigan), a few in Lomme Bay, and several in Magdalena Bay. A cub, from Lomme Bay, was given to Mr. Smith by the master of a Norwegian smack, who succeeded in smoking four out of an earth: of these two were brownish, the other black. We found in Wiide Bay that foxes are fond of gnawing at the tips of velvet-covered antlers of dead deer. I believe they sometimes gnaw off the points of cast antlers; for I saw many which were defective, and whose points seemed to have been nibbled away. We were led to suspect, with Prof. Newton, that these foxes lay up in the autumn a store of birds for the winter: unless they do so, it is hard to imagine how they can subsist until the return of the birds in May. Ptarmigan, it is true, are not uncommon, and remain in the country throughout the year; but foxes are plentiful in places where ptarmigan are never found. If they do lay by a stock of provisions, it is no doubt composed largely of sandpipers, snow buntings and skuas, as well as ptarmigan, all these birds being more addicted than any others in Spitsbergen to flapping on the ground as if they were disabled whenever they have the least excuse for doing so. Whilst they are intent upon engaging the fox's attention by their violent struggles, he suddenly springs upon them, and if they rise, jumps after them into the air, and they cannot always get out of his reach in time. In the case alluded to at the commencement of this paragraph, the ptarmigan kept within a yard or two of the fox, barely evading his repeated sallies for several minutes. We hastened to the spot, but he disappeared with her before we could get there.

Phocidæ.—There is little to be said about the four species of seals which inhabit Spitsbergen. Some of each kind were killed by our party. The crew applied names at haphazard to young examples. Very small ones of any sort were termed "floe rats," provided that they were not evidently "whitey-coats" (*Pagophilus grænländicus*, first year). Seals of a slightly larger size, but not full grown, if they were dark above and whitish beneath, gave occasion to a fair amount of controversy: some of the hands would maintain that these were young "saddle-backs" (*P. grænländicus*); others would be positive that they were nothing but young "ground

seals" (*Phoca barbata*), sometimes correctly; sometimes the subject all the while would really be a young "ringed seal" (*Pagomys fœtidus*). When the young of this last kind was prettily marked with ringed spots, none of them questioned its identity with the "freshwater seal" of the Straits—a northern fur seal, with whose mere skin I am acquainted. The term "Dorothy seal" was equally vague in its application. It was only in the determination of adult seals that the men were usually correct. Besides this I need only remark that the stomach of a ground seal killed in lat. $79^{\circ} 40' N.$, long. $5^{\circ} E.$, contained a frond of *Laminaria saccharina* bitten into little bits; and that Lieut. Chermiside found on the south side of Moffen Island a large number of krangs of walrus which had been killed at a distance of more than one hundred yards from the sea. Capt. Walker got me some ticks (*Hæmatopinus Trichechi*) from a walrus he killed in Lomme Bay. On Sunday, 18th June, 1871, our fireman, Nicholas White, then of the 'Polynia,' saw a walrus catch a loom in Lancaster Sound: the bird was swimming, and the sea-horse seized it from below.

Rangifer tarandus.—Traces of reindeer can be found all round Spitsbergen wherever the ground is free from snow, and on most of the islands. Judging from cast antlers, we were led to think it not unlikely that the comparative robustness or slightness of the beam may be dependent on the nature of the soil prevailing in the district over which a deer is accustomed to range; for we noticed that where limestone was predominant the antlers we picked up were far stouter and more heavy than any we could find in places where hyperite, granite or other durable rock formed the basis of the soil. The reindeer's favourite food in Spitsbergen appears to be the dwarf willow (*Salix polaris*); for out of over sixty shot in Wiide Bay, only one or two had been feeding upon anything else. They seem to be indifferent to the sight of men standing still or lying down. A fawn one day, after it had looked at me, passed within two paces of me as I lay upon the ground, without being frightened; but they generally trot off if they see you move. Some, however, were so tame that they continued to graze whilst I was climbing about a cliff within a hundred yards of them, and the stones dislodged by my feet bounded past them. They saw me, but I did not disturb them in the least. Mr. Smith and Capt. Fairweather shot a doe and fawn on Phipps's Island the day before we left the Seven Islands the last time. They came upon them

unexpectedly, fired at them at a distance of about eighty yards, and missed them cleanly. Startled by the report, the deer began to trot away from them, but she soon turned and advanced towards them; when she was within fifty yards of them they fired again, and this time with effect: they did not see the fawn at all until they found it dead beside its mother, killed by the same bullet. Up to that time we had accounted for the existence of deers' traces on the Seven Islands in the following way. Deer, it is said, can manage to live comfortably without food for six days: they can find something to eat on Walden Island, if they cannot on any of the others. Starting, therefore, from Walden Island, they could well afford to make the grand tour, spending a day upon each of the others, without being actually reduced to extreme starvation. Naturally they would gladly cast their antlers by the way to save the trouble of carriage, and people finding them upon the rocks would at first suppose that deer really could pick up plenty of food where they could see nothing but stones.

Balæna mysticetus.—In various places along the coast we found many whales' bones of great age at considerable heights above the sea. These evidences of upheaval having taken place within the last few centuries have attracted the notice of all geologists who have visited the Spitsbergen Archipelago. Amongst localities from which these bones have not been reported before, I may mention Carl's Island, at the lower entrance of Hinlopen's Straits. There we found a large jaw-bone, much decayed, partly embedded in drift-shingle at an elevation of eighty or a hundred feet above high-water mark. At a lower level, but yet far beyond the present influence of ice or sea were jaws and some broken vertebræ in Augusta Bay. The only living right whale that we saw was at the Western Ice; its blast was just like a puff of steam from the escape-pipe of a brewery engine; but it does not do to use such untechnical language in Greenland, unless you are talking to an old salt: he no doubt will overlook the offence for the sake of the associations which it may recall to his mind.

A. E. EATON.

(To be continued.)

NOTE.—I have had before me a paper by my friend Prof. A. Newton, of Magdalen College, Cambridge, "Notes on the Zoology of Spitsbergen" (Proc. Zool. Soc. Lond., November, 1864). In it will be found numerous references to other authors. On many points upon which we have touched

in common it will be found that we concur; where we do not, our discrepancies may be accounted for by our observations having been made in different districts. The knowledge that my hares have been previously coursed by Prof. Newton will make intelligible how I came to follow so closely in his track. With respect to the birds the same will hold good, my remarks having a direct bearing upon his "Notes on the Birds of Spitsbergen," in the 'Ibis' for April, 1865.—*A. E. E.*

The Cirl Bunting an Autumnal Songster.—The fact that the cirl bunting is equally an autumnal songster with the congenerous yellow species has not, so far as I am aware, been noticed by ornithologists, at least I can find no mention of it in some of the leading works on British birds; consequently, on hearing one in full song on the 4th of the present month, I thought it might be worth while to send a short note for the 'Zoologist' on the subject. About Plymouth the cirl bunting is quite a common bird, and in August I have repeatedly heard its song, which the cock delights to deliver from the lower branches of an elm, or may be only a bush in a hedgerow bounding some grassy enclosure, manifesting less partiality for spots about corn land or other arable fields than the yellow bunting, and appearing to prefer low-lying situations, though the well-nigh universal distribution of the latter bird causes the two to be often met with together. It may be worth while for me to add that in the neighbourhood of Plymouth the so-called common bunting is less common and 'more of a local species than is the cirl.—*T. R. Archer Briggs*; 4, *Portland Villas, Plymouth, Sept. 12, 1873.*

Hawfinch Breeding in the New Forest.—It will perhaps be remembered that in a recent number of the 'Zoologist' (S. S. 3491) I expressed an opinion that the hawfinch does occasionally breed in the forest; and this summer the fact has in several instances been proved, although no nest or eggs have come under my own observation. A man informed me that he had discovered several nests of this species in the south-western portion of the forest in May; still as he failed to supply me with eggs I somewhat doubted his assertion; but about the middle of June I had several young hawfinches scarcely fledged, strange-looking little creatures, sent me from near the locality he had indicated, so I at once concluded they must have come from one of the nests he had found. Again on the 3rd of June I had two more sent me from another locality, but these were better feathered, although I suspect they could not have flown much, as the peculiar shaped feathers of the wings were in a very undeveloped state. Only two of the birds I have received were worth preservation, but I dissected the stomachs of all (seven in number), and in each case they were literally crammed with peas, in fact the older birds were shot whilst in the act of splitting open the pods, amongst which they did considerable damage. Peas seem to be the

principal food of the species in this neighbourhood, as specimens of the bird were killed in February whilst pulling up the young pea-plants as soon as they appeared above-ground.—*G. B. Corbin ; Ringwood, Hants, Sept. 1873.*

Nesting of the Sandwich Tern on Walney Island.—In the September number of the 'Zoologist' I promised to make enquiries concerning the time of nesting of the Sandwich tern on Walney Island, and to let Captain Feilden know the result. As I only received an answer to my letter the other day I have hitherto been unable to fulfil that promise. Capt. Feilden was right in his supposition that I had been misinformed concerning these birds: the son of the proprietor of the land on which they nest now tells me that there were, if he remembers rightly, a few of the large sea swallows about when I visited the island (31st May), and that they remained, he thinks, about a fortnight after I left. I can only suppose that the watcher, who accompanied me to the nesting-ground of the blackheaded gulls, told me the Sandwich terns had then left the island because he did not wish me to disturb them; and I can the more readily believe this, as he was very anxious I should not remain a minute near the gulls to blow the eggs I had taken; and indeed he watched over them as jealously as a gamekeeper guards his pheasants. I am sorry I made the mistake I did, and, but for the delay in receiving a reply to my letter, I should have corrected it sooner.—*H. Durnford ; October 18, 1873.*

Ommastrephes sagittatus off Hastings.—On the 26th of September a remarkably large and fine specimen of *Ommastrephes sagittatus* of Lamarck was brought to Hastings, and was purchased by Messrs. Gibson and Allen, the fishmongers. It was said to have been taken by the fishermen in one of their mackerel-nets. The dimensions of the creature are as follows:—

Length from the front of the head to the point of the tail	-	1 ft. 9½ in.
Circumference of body	- - - - -	1 „ 2 „
Greatest breadth of tail-fins	- - - - -	1 „ 2 „
Length of head	- - - - -	4½ „
Length of each tentacular arm	- - - - -	2 „ 3¼ „
Length of spread from tip to tip of the extended tentacular arms	- - - - -	4 „ 9 „
Length of rows of suckers on each tentacular arm	- - - - -	9½ „
Length of the largest of the tentacles	- - - - -	10½ „

According to the accounts given in Forbes and Hanley's 'History of British Mollusca,' it would appear to be rare as a British species, and that it is by far the largest specimen that has been recorded as taken on our coast. I have salted the specimen, and have sent it to my friend Mr. Henry Lee, who has given us such interesting anecdotes of the habits and manners of the Octopods in the tanks of the Brighton Aquarium.—*J. S. Bowerbank ; 2, East Ascent, St. Leonards-on-Sea.*

[The genus *Ommastrephes* of D'Orbigny comprises those animals so familiar to fishermen, and indeed to all "toilers of the sea," or visitors of the sea, by the popular names of "squids," "flying squids," "cuttles" or "arrows"; every one also knows their single bone or "pen," a semipellucid flattened object dilated at its attenuated and almost membranous margin, and altogether resembling horn rather than bone. These squids are distributed over the entire world of waters, and the work of D'Orbigny shows us how they and their allies the *Ammonites* and *Nautilites* swarmed in the oceans of bygone times. Several of my sea-going friends seem to regard them as flying fish, but naturalists well know that they are cephalopod mollusks, and belong to a different division of the animal kingdom to that which includes the fishes. Their flight is *curious*. I know no better term than that vague and hackneyed one: the terms "sagitta," "sagittatus," given not only to the present but to several other species, sufficiently indicate the habit, although these terms have been supposed to have reference to the feather or pen concealed, rather than to their arrow-like flight. It is probably when pursued by the porpoise, the tunny, albacore or bonito that this flight takes place; but some believe that the flight of fishes (*Exocetus*) and squids (*Loligo*, *Teuthis* and *Ommastrephes*) is merely an act indicative of exuberant spirits and animal enjoyment. I will not speculate on this, but try to give some slight idea of a seeming anomalous mode of locomotion. All the mollusks consist of a body, head, mouth, funnel and foot; in these larger and more highly organized, or, as some call them, typical mollusks, this foot is divided into eight long and almost linear strips furnished with sucking disks, which thus become prehensile organs: technical naturalists call these divisions, legs, arms, fingers, tentacles, tentacular arms, &c., with praiseworthy indifference. When a rapid act of progression has to be performed, the animal assumes what we should consider a reversed position, and drives itself backwards by the sudden and violent expulsion of water through the funnel: the body then takes the lead; and the divisions of the foot collapse, and fold together much after the fashion of a closed umbrella: if you can imagine an umbrella flashing through the water point foremost with the velocity of lightning, you obtain a very good idea of the locomotive powers of these mollusks: they not only cleave the water in this arrow-like flight, but, leaving the water, enter on the realms of air, continuing their course in the same direction: their powers of flight are of course limited, as the air furnishes them with no fulcrum for taking a second flight when the impetus gained by the first is exhausted; so they fall into the ocean, and then regain their powers of flight; or, as occasionally happens, get stranded on the deck of a ship, and there, after exciting much wonder and some fear, perish miserably by the hands of the sailors. A friend of mine who passes most of his nights on tropical seas, insists that these squids are luminous, that, as they shoot through the water and produce the effect

of splendid aquatic fireworks, the light proceeds from their own bodies. I attribute this glorious illumination of the ocean to its smaller inhabitants, whose pyrotechnic properties have been investigated and ascertained.—
Edward Newman.]

Memoir of the late Thomas Dix.

SINCE the brief notice in the 'Zoologist' for January last (S. S. 3380) of the death of this well-informed but most unassuming naturalist, I have been desirous to embody in a brief memoir such facts respecting his ornithological pursuits as our personal friendship and the communications of his family have placed at my disposal.

Mr. Dix was a native of Norfolk, having been born in 1830 at Dickleburgh, near Harleston; but his earliest associations were connected with the "Breck" district to the south and west of the county, his father having removed shortly after his son's birth to Sturston, near Thetford, where, amongst other rural sounds that attracted his notice as a child, the nocturnal cry of the stone curlew (*Edicnemus crepitans*) was indelibly impressed upon his mind, from a something of dread connected with its melancholy wailings. From Sturston, whilst he was still a boy, his family moved into Essex, and though it would seem that his special taste for Ornithology did not develope itself till later in life, yet an acquaintance formed thus early with Mr. Henry Doubleday, of Epping, and subsequently with Mr. Edward Newman, the Editor of this journal, proved unquestionably the first incentive to those studies which had so great a charm for him in after years. To the influence, in this respect, of his friend Mr. Doubleday he was ever ready to testify, both how much he owed to and how highly he valued a friendship that to the end of his short life was counted one of his greatest privileges. With his tastes thus fostered, and directed more particularly to one branch of Natural History, his out-door occupations—always more or less connected with agricultural operations—afforded every facility for studying the forms and habits of his feathered favourites; and with a power of observation possessed by few, he thus acquired the store of ornithological facts to which I have myself been so frequently indebted; yet which none but his most intimate friends gave him credit for possessing, through the reserve and diffidence that formed so marked a characteristic of the man.

The same hesitation to advance his own opinions or subject himself to criticism in public print was the cause of his literary efforts, with one exception, being limited to a few brief notes on ornithological occurrences, contributed from time to time to the pages of this journal.

That thoroughness, however, and earnest love of truth, which won for him, whether in business transactions or in private life, the respect and esteem of all, was not less indelibly stamped upon the pursuits of his leisure hours. To take nothing for granted upon which a doubt might exist, and to deem no amount of time or trouble too great to establish a fact, however trivial, were the golden rules that guided him in his Natural-History researches, and gave a double value to the result of his investigations. I could cite many cases in which his extreme good nature, apart from the general interest that he felt in such enquiries, led him to take infinite pains in collecting authentic information for friends and correspondents; memorably so, during the great sand grouse immigration of 1863, at which time, by his careful sifting of evidence in different localities, I was materially assisted in drawing up a paper on the distribution of that species in Norfolk and Suffolk.

For some time prior to our first meeting, the name of Thomas Dix had been familiar to me through the pages of the 'Zoologist,' in connection with Ornithology in the Eastern Counties, and if I cannot now recall the exact date, I well remember it occurred in the Norwich Museum, and that an hour spent together in the "British Bird" room commenced at once, through the freemasonry of kindred tastes, a friendship warm as it was mutual. An acquaintance thus formed led naturally enough to a correspondence on kindred subjects, which continued uninterruptedly till within a few months of his death; yet I can but regret that, although his occupations at that time laid chiefly in the adjoining county of Suffolk, our opportunities of personal intercourse should have been limited to his visits, at long intervals, to Norwich and West Harling. There was one occasion, however, when he returned for some weeks to Norfolk, the recollection of which will always be a source of peculiar gratification. It was in the early summer of 1864, just previous to his entering upon an appointment in Wales, that I paid a long-promised visit to him, at the house of a relative, Mr. John Ringer, of West Harling; and it was there, in our daily rambles and hourly conversations on the one absorbing topic of Natural

History, that I was able to appreciate the full extent of his out-door experience and accurate knowledge of the notes and habits of even our least familiar British birds.

By daybreak of the morning after my arrival we were off to a large beech plantation, the only haunt in that neighbourhood of the wood warbler (*Sylvia sylvicola*), so local in its habits, and for the first time, from the topmost branches of the trees, I heard the peculiar and unmistakeable note of this species. Later in the day we listened to the song of the wood lark by the covert side, whose every haunt seemed familiar to him; or on the open "brecks," with the aid of a good glass, watched the actions of the stone curlew, so difficult of approach, and examined such nests, both of the lapwing and curlew, as had been previously found by the shepherds. The rich meadows and sedgy banks of the stream had other nests to be visited, which led to many an anecdote worthy of record; and, like a true naturalist, his observations were by no means confined to birds alone, but extended as well to botanical objects and the habits of insects and our smaller Mammalia. In the dusk of the evening we again skirted the heath and plantations where

"High in air and poised upon his wings

Unseen, the soft, enamoured wood lark sings,"

and watched the amorous play of the nightjars, striking their wings over their backs, with a clearly perceptible sound, or uttering their jarring notes as they flitted past. It was indeed a day to be remembered, in such companionship, and its chief gratification for him, I know, consisted in having shown me two or three species of birds with whose habits, owing to their very local distribution, I was till then but little acquainted. But even that long summer's day had not exhausted our enjoyment of rural sights and sounds, since, long after midnight, by the open window of my room, we sat listening, as I have elsewhere attempted to describe it, to the tremulous whistling of the curlews, and the wail of the lapwings, from the adjacent "brecks;" whilst, in strange contrast to their wild clamour, the nightingale poured forth its melody from the garden, and as the soft night air came in upon us, laden with the scent of the honeysuckle, the paths, shrubs and buildings were bathed in the brightness of the full moon.

It was here also that I first became aware of his skill as an amateur taxidermist, his thoughtful kindness having led him, during his stay at Harling, to procure for me certain specimens I had

expressed a wish for, and which, with others in my collection, mounted as well as in skins, are evidences of the care and skill he devoted to this work.

As an instance, however, of his extreme modesty and reticence in all matters connected with his own accomplishments, I may here state that, although he had occasionally spoken of having a few birds "at home," it was not until very recently, when I paid a visit to his father, at Ipswich, that I became aware of the extent and value of his collection,* consisting of some ninety cases, nearly all mounted and arranged by himself. As in all good amateur work of the kind, the time devoted to small details is in this instance amply repaid by the effect produced; the freshness and beauty of plumage in his specimens being the result of hours spent in removing every blemish from their feathers, before either attitude or expression were attempted. This is specially noticeable in his gulls and sea-fowl, from the "Stack" rocks and other parts of the Welsh coast; but, with the exception of the latter, nearly all his birds were procured either in Norfolk or Suffolk, and, though not comprising many rarities,† the entire series fairly represents the orders and genera of our British list, whilst his Raptores—the most difficult class of birds to represent truthfully in a preserved state—are amongst the best evidences of his skill, being perfect models in form and power of expression. Perhaps the chief test, however, of his patience, combined with extreme delicacy of manipulation in the arrangement of small objects, is shown in an exquisite case of humming-birds, containing not less than fifty specimens, which is also in his father's possession at Ipswich.

The autumn of the year 1864 found Mr. Dix actively engaged as agent on a large estate at Kilwendeage, near Kenarth, Pembroke-shire, his field of observation being thus suddenly transferred from extreme east to west, where a mountainous district and a bold rocky coast afforded many new features. His earlier letters from this

* Since writing the above I have ascertained that, besides his own collection, Mr. Dix formed a still larger one for Mr. John Ismay, of Newcastle-on-Tyne, of which, I believe, every specimen was mounted by himself.

† As British-killed specimens, perhaps the rarest in his collection were a pair of European whitewinged crossbills (*Loxia bifasciata*), the male killed near Thetford, in Norfolk, the female near Carlisle, presented to him by Mr. Doubleday, having been previously figured by Yarrell. These, with a fully adult roughlegged buzzard, trapped on Thetford Warren, have, at his special request, passed into my possession.

locality are full of interesting notes on ornithological subjects, describing such birds as had already come under his notice, and comparing the scarcity or abundance of certain species, in that portion of the principality, as contrasted with our eastern counties—the almost total absence of the house sparrow and the number of magpies striking him particularly on his first arrival. It was from the pleasure which the perusal of these stray notes afforded me that I strongly urged him, so soon as his acquaintance with that neighbourhood would permit, to prepare a list, with observations on the Birds of Pembrokeshire, and though, from reasons before alluded to, he was disinclined to attempt it, I had the satisfaction of seeing my suggestion carried out, in the admirable paper which he contributed to the 'Zoologist' in 1866 (S. S. 132). This list, which, as he remarked at the time, contained only those birds that he had seen, or for which he had undoubted authority, was considerably enriched by a second communication to the same journal in 1869 (Zool. S. S. 1670), containing his own more recent observations, particularly on the coast, with the result of visits to local collections and personal interviews or correspondence with the few resident naturalists. The whole forms undoubtedly a valuable contribution to the study of British Ornithology, and from a part of the kingdom whence reliable notes on such matters are rarely obtainable; but in reading his graphic description of a visit to the "Stack" rocks at Flimstone, with the impressions made on his mind by the grandeur of the scenery and the presence, in thousands, of the sea-fowl that frequent those cliffs, one regrets that a doubt, on his part, of his descriptive powers, should have left us so little from his pen.

In this new vocation his force of character and earnestness of purpose enabled him to surmount many difficulties, arising not less from the dialect of the country than from local prejudices; and I have reason to know that his name will be long remembered in that neighbourhood in connection with an improved system of farming operations, and the successful rearing of stock, for which his experience in the twin counties of East Anglia had well fitted him. He here developed also a taste for the cultivation of fruit and flowers in the extensive forcing-houses on the estate, and the success attending his earlier suggestions as to the mixture of soils and a more effective drainage, led to his superintendence being as much sought in that department as in the wider field of agriculture. More magnificent fruit, in size and flavour, I never saw

than some grapes and a pine, which, on one occasion, he sent me as specimens of his own growing.

With his time thus fully occupied, the only drawback in his new home seems to have been the total separation from old associates, and particularly those of kindred tastes, as, with the exception of the occasion of his marriage with a daughter of Mr. Pymar, of West Harling, and once subsequently, he did not revisit Norfolk until the state of his health compelled him to resign his situation and return to his native county. Always susceptible of cold, and predisposed, no doubt, to the disease which latterly developed itself in his system, he was constitutionally unfitted for exposure to the damp chilling fogs so common in Wales, and a permanent deafness succeeding a severe influenza, proved both a cause of anxiety to his friends and a sad trial to himself; for, in his letters at that time, he adopted almost the words of Gilbert White, of Selborne,* in lamenting a like affliction, "I lose all the pleasing notices and little intimations arising from rural sounds; and May is to me as silent and mute with respect to the notes of birds, &c., as August." This proved, however, but the forerunner of more serious symptoms, and, though himself buoyed up with that strange hope of ultimate recovery so usual in consumptive patients, it was but too evident to those who saw him on his return to Norfolk in 1871, that he would not long be with us. Still he lingered on, at his father-in-law's residence at West Harling, till near the close of the following year, when his death took place on the 19th of November, in the forty-second year of his age; and thus passed away, in Christian reliance, on other merits than his own, "a good man and a just," the moral of whose life, "*magna est veritas*," might be worthily inscribed upon his tomb. His remains were interred, with other members of his family, in the cemetery at Ipswich.

Mr. Dix left no children, and, scarcely within twelve months of his own death, his wife, whose health had no doubt suffered from her unceasing attendance upon him in his last illness, died very suddenly, from the same insidious malady, on the 14th of August, 1873.

HENRY STEVENSON.

Norwich, September 30th, 1873.

* Letter LXII. (to the Hon. Daines Barrington).

Ornithological Notes from North Lincolnshire.

By JOHN CORDEAUX, Esq.

(Continued from S. S. 3687.)

AUGUST, SEPTEMBER AND OCTOBER, 1873.

Golden Plover.—Aug. 9th. Saw two golden plovers with a flock of lapwings; one of these was in full summer plumage.

Gray Plover.—Aug. 16th. First observed in their autumnal migration, apparently old birds.

Swift.—Aug. 16th. When driving homeward across the "wolds" this afternoon, flocks of swifts kept passing over, at a considerable altitude, and flying south. A friend in this neighbourhood had observed the same thing during the day.

Wryneck and Pied Flycatcher.—Aug. 25th. Mr. Richardson, of Beverley, informs me that he shot a wryneck at Spurn on the 25th; also several immature pied flycatchers.

Gray Plover and Whimbrel.—Aug. 27th. Numerous on the river-flats.

Curlew Sandpiper.—Aug. 30th to Sept. 1st. Large migratory flocks seen in the Great Cotes marshes. (See Zool. S. S. 3720.)

Green Sandpiper.—Sept. 3rd. A pair seen on the Ulceby beck.

Common Sandpiper.—Sept. 3rd. Rather numerous in our marshes during the autumnal migration, although entirely absent during the summer months.

Knot.—Sept. 10th. Flocks of young knots on the foreshores.

Starling.—Sept. 26th. This afternoon, which was very close and warm, there were hundreds of starlings, also peewits, rooks, and a flock of missel thrushes, hawking, like swallows, for insects. I watched them for some time, and can only conjecture their prey was the common crane-fly, as on this day the air seemed very full of these insects.

Hooded Crow.—Oct. 9th. First seen. The main body came from the 18th to the 21st. On the latter day I was on the sea coast, near Tatney, and saw for several hours small parties of "hoodies," at short intervals, come in from the sea: they flew very low, and against a south-west wind with driving rain: they never swerved a yard to avoid me, and I could have dropped many had they been worth the cartridge.

House Martin.—Oct. 10th. In a neighbouring parish a pair were feeding their young, still in the nest, under the eaves of a dwelling-house.

Swift.—Oct. 10th. Last swift seen, apparently a young bird.

Chimney Swallow.—Oct. 14th. Last seen.

Godwit.—Oct. 16th. Since the commencement of the month very numerous on the coast: I have heard of four killed at a shot. On the 21st there were many on the sands near Tatney, mainly the young birds of the year.

Wild Geese.—Oct. 20th. First flight seen.

Brent Geese.—Oct. 21st. Saw a small flock on the coast this morning.

Brambling.—Oct. 21st. A friend, who was shooting with me to-day, killed an old male brambling on the "fitties," probably one having just arrived.

Gray Plover.—Oct. 21st. Saw numerous young birds on the coast; specimens obtained were in the golden spotted plumage, peculiar to the young only of the year. Also saw a fine old bird yet in full summer plumage; indeed I could not perceive the slightest tendency to a change; the breast was as black as in a late spring specimen, such as we see on our flats.

Snow Bunting.—Oct. 22nd. Saw the first snow bunting, and on the following day flocks crossed the Humber into our marshes, coming from the direction of Spurn Point.

Woodcock.—Oct. 27th. The first flight came on the night of the 27th; wind E.N.E., rather thick and hazy on the sea, but clear above, and a very beautiful night. On the morning of the 28th I got two couples in this parish. The same night, judging from what I saw passing over in early morning, and in the marsh hedgerows during the day, came across great numbers of fieldfares, blackbirds and thrushes, also thousands of larks; altogether a most extraordinary arrival of birds. The blackbirds were principally young males.

JOHN CORDEAUX.

Great Cotes, Ulceby, Lincolnshire.

November 5, 1873.

Ornithological Notes from Devonshire, Cornwall, &c.

By JOHN GATCOMBE, Esq.

(Continued from S. S. 3720).

SEPTEMBER, 1873.

4th. Visited Lifton, Devon, in the neighbourhood of which I found sparrowhawks and kestrels plentiful; indeed the latter have been very numerous in both Devon and Cornwall during the present autumn; but I am sorry to add that I have seen many of these birds lately in the birdstuffers' shops, which had been caught in "gins;" likewise a fine buzzard and two barn owls, which had shared the same fate. It is a great pity that gamekeepers and farmers will persist in destroying birds that do so much good, and the stomachs of which I generally find crammed with the remains of mice and beetles. A few days since I found the stomach of a kestrel to contain, in addition to beetles, the full-grown larva of the moth *Hadena oleracea*. At Lifton I also found swallows very plentiful, and observed martins still feeding their young in the nests.

5th. Young herring and lesser blackbacked gulls very numerous in Plymouth Sound.

8th. Went into Cornwall, and remarked curlews, godwits and sandpipers, of many kinds, on the mud-flats of the St. Germans river; also some blackheaded gulls not long returned from their breeding-stations. In the fields there were numbers of titlarks in small flocks or families.

11th. Wind very strong. Numbers of martins were congregating and flying round our house early in the morning; some of them constantly fed their young on the wing. Examined a fine Cornish chough which had been killed in Cornwall, and the stomach of which contained Coleoptera and grain.

14th. A very large flock of swallows flying about and constantly settling on the telegraph-wires; many of these, too, fed their young on the wing. I was told by a friend who has lately visited Yorkshire that he had observed many flocks of wild geese (bean geese, I suppose), in August, passing over the wolds, and that he did not remember ever having seen them so early before.

15th. Blowing and raining very hard; nevertheless a large company of swallows appeared flying round, very high, apparently

hawking for insects between the showers and squalls, though it seemed strange for insects to be abroad during such weather, and so high too. The lofty flight of the swallow family during stormy weather has often puzzled me.

16th. Visited the estuary of the Laira, and observed, with a powerful telescope, the actions of many birds on the mud-flats; among them were gulls, herons, ring dotterels, dunlins, knots, red-shanks and turnstones. Many of the dunlins still retained the black patch on the breast, and two of the knots were perfectly red underneath—a state of plumage rarely met with in this neighbourhood. All these birds were on the soft mud-banks, and it was most interesting to observe their actions and different modes of feeding: the ring dotterels running swiftly, and then suddenly stopping to pick up their food; the dunlins moving quickly about, eagerly probing with their bills all the while; but I observed that the turnstones would make for any stray substance they could see, such as tufts of sea-weed, shells, &c., which they dexterously turned over, and carefully examined. I observed two cormorants and a heron perched side by side on a floating plank or log in the river, where they remained for some hours. By the way, I should mention that one of the cormorants had the whitest breast I ever saw for a bird of that species. It is not uncommon to see cormorants with a tolerable amount of white on their bellies at this time of the year; but the one above mentioned seemed to be perfectly white from the gular sac to the vent, which, as the bird was sitting or standing bolt upright, gave it a striking resemblance to the great auk. I do not remember seeing this stage of plumage described in works on Ornithology; but I remember reading a discussion in the 'Field,' some years ago, on the subject of white-breasted cormorants. I found kingfishers and common sandpipers very plentiful too; also, pied wagtails and a few of the yellow. Corn crakes have been very common in the Plymouth market lately, indeed more so than I ever remember, and golden plovers were there, still showing partially black breasts; also a few teal. A friend told me that he had bought a great northern diver, in the flesh; it had been killed at Weymouth on the 29th of August: I mention this, as it is a most unusual time for such a bird to be found on our coasts. From his description, it was not at all in summer plumage: I imagine therefore it must have been an immature bird, which perhaps had been injured in some way so as to

have prevented its departure at the same time as others of its species.

20th. Took a ramble into the country; found green woodpeckers plentiful, and wood larks singing beautifully; also observed a female hen-harrier, a bird very numerous with us of late years.

23rd. Went to Laira in a boat; saw twelve herons close together on a mud-bank, met with some common redshanks, and killed a wigeon—very early for the appearance of this species on our coast. Common sandpipers still plentiful.

25th. There was a great congregation of martins on the telegraph-wire, and many flying about; I counted above one hundred and twenty on a wire close together, reminding me of a string of beads.

29th. Took a trip by rail, and on passing by the mud-flats near Teignmouth, I found them almost covered in many places with blackheaded and herring gulls, both young and old; there were also a few mews. Starlings exceedingly numerous in the fields throughout the journey: these birds are yearly increasing to a great extent. Saw a dunlin a few days since which had been killed by flying against a telegraph-wire.

OCTOBER, 1873.

1st. When in the neighbourhood of Tiverton I found wood larks plentiful, and in full song, but on again visiting the flat marshy moors of the adjoining county of Somerset, near Bridgwater, where I observed so many kestrels last autumn, to my great surprise I did not see one, nor could I account for their absence until I heard a farmer casually remark that all the rats and mice, which were swarming last year about the fields, had somehow disappeared, having perhaps been drowned by the floods of last winter, the flat country around for miles being for months under water. This to me seemed at once to account for the absence of the kestrels. These birds have been very numerous in Devon and Cornwall during the present autumn, and many have been, I am sorry to say, shot or trapped, and the stomachs of all examined by me contained only the remains of beetles and mice, with the exception on one occasion of the larvæ of a moth. There is now in the possession of Mr. Lucraft, animal preserver, of Stonehouse, a beautiful young pair of living orangelegged falcons (*Falco vespertinus*), which were caught on board ship, it is said, off the coast of Siberia. They are in the first year's plumage, very tame and docile, will sit on the

fist and take food from the hand in the most gentle manner. Their plumage on the upper parts is of a very dark brownish slate, each feather being edged with rufous, but there is as yet no sign of red on the thighs or under tail-coverts; the base of the bill and legs are orange; the claws the same, but lighter; and the tail much barred. These birds were observed to alight on the rigging or yard of the vessel, I believe, by day, and when it was dark one of the crew went aloft with a lantern, the full glare of which he threw for a few seconds on the poor birds eyes, and then, suddenly removing the light, left the bewildered creatures in such intense darkness that they were easily captured. After this they were kept in the fore cabin and fed by the sailors on bits of flesh or small birds, which were constantly caught at roost in the rigging, and on these being let go in the cabin the hawks would instantly dart after and catch them, much to the amusement of the men.

4th. I was pleased to find goldfinches in large flocks, feeding in elegant attitudes, on the thistles at Moorland, near Bridgwater. I think these birds have been rather plentiful during the autumn, as I have observed more than usual lately in the vicinity of Plymouth, but I am sorry to add that birdcatchers have been numerous too.

From Bridgwater I visited London for a few days, and on the 8th had a peep at Leadenhall Market, where I found wild birds scarce, with the exception of gray plovers, many of which had still black feathers on their breasts, the remains of the nuptial plumage.

At Plymouth, on the 13th, after my return, I found a few wheatears still on the coast, and some kingfishers; also many titlarks, in their pretty winter dress. In the Market I observed some bartailed godwits and a spotted rail, a species rarely met with in our neighbourhood.

15th. I counted, with the aid of a telescope, above two hundred gulls resting on the West Mud, opposite Devonport Dockyard, and a great number flying in the harbour at the same time, and I have no doubt that as many more might have been found on the mudbanks of several other rivers and estuaries in the neighbourhood. This I feel assured is in a great measure the result of the Sea Birds Preservation Act.

16th. A large number of golden plovers in the Plymouth Market, all obtained from the Devon and Cornish moors, and judging from the quantity killed I think great flights of these birds must have made their appearance in the western counties; there were many

common and jack snipes in the market also. Speaking of snipes, I may here mention that a short time since I met a friend who had been shooting in Ireland, who told me that he had killed, amongst others, a very beautiful variety of the common snipe, of a most delicate buff-colour, with the usual markings, showing, as it were, faintly through it. This bird he carefully packed in a cardboard box and posted to me, but I grieve to say that it never came to hand.

18th. Visited Bovisand on the coast, and remarked that cormorants were very plentiful; there were upwards of thirty perched on one rock, called the Little Newstone, besides many more flying and diving near the rocks in different directions. Several razorbills, too, have been seen, and some obtained, on the coast and in the Sound lately. Observed a solitary wheatear, on the rocks close to the sea, which was very tame, and I expect the last I shall see for the season. Found rock larks and stonechats plentiful on the coast, with a few wrens. A few weeks since I remarked there was not a rock lark to be seen. I have not met with a phalarope during the autumn, but Mr. Nicholls (brother to the Kingsbridge taxidermist) told me that one specimen of the gray phalarope had been picked up at Thurlstone Ley, near Kingsbridge, at the beginning of the month, and that some sanderlings had been killed on the coast near the same place. He also told me an interesting anecdote of a tame young herring gull, which was taken and reared from a nest in the neighbourhood; having flown away during the breeding-season, it returned after an absence of sixteen months, in nearly full adult plumage, and fearlessly alighted in the small back court in which it was brought up, much to the amazement of the cottagers, who, seeing a lovely "snow-white gull," as they called it, close to their door, did not of course recognize their own dingy pet, until a little boy of the house, who used to feed and stroke the bird on the back, came quietly forward, when, much to the astonishment of the family, and to himself as well, he found that he was allowed to do so still. This bird, I understand, is living now, constantly going off to sea, but returns almost daily to be fed; yet, although it comes almost into the house, no one is allowed to take the liberty of stroking its back save its old friend the little boy.

21st. Some tufted ducks in the market.

24th. A few common terns in the Sound, after a severe gale. I have seen but one young black tern this season.

29th. Many flocks of common scoters appeared on the river Tamar after a severe frost, and several were killed; curlews were also plentiful. I also saw some scoters and gray plovers in the market; and, on the same day, observed several swallows near Plymouth—rather uncommon to see swallows and wild ducks at the same time of the year. A speckled diver was also killed in the Sound on the 29th, and a northern diver seen.

31st. Woodcocks, snipe and landrails in the Plymouth Market.

JOHN GATCOMBE.

8, Lower Durnford Street, Stonehouse, Plymouth,
November 7, 1873.

Ornithological Notes from Godalming.

By WILLIAM STAFFORD, Esq.

SEPTEMBER, 1873.

1st. At Shackleford, a partridge's nest was found containing ten eggs; the old bird was wounded, but was found again on the nest three days afterwards.

5th. A whitethroat's nest was brought me, with four eggs set hard.

8th. A shorteared owl was sent me, shot here; condition very fat.

10th. Two specimens of the common ring dotterel were shot on the river bank between Guildford and Godalming; they were in good fat condition. A white owl's nest containing six young ones is to be seen near here, and another at Elstead.

11th. A Manx shearwater was brought to me, killed at Alder-shot, in starving condition. A common brown owl was brought me, shot at Eashing; its stomach contained the remains of thirteen large mice.

12th. My son has just brought home a reed warbler's nest, containing three eggs, taken at Ockford pond; the eggs were set hard.

14th. Saw a nest of young bullfinches, three in number.

Cuckoo.—14th. My young cuckoo, which has been a strong healthy bird ever since the 1st of September, has been very restless, trying to get out of his cage. I suppose instinct tells him it is time to be off.

Martin.—22nd. I have two house martin's nests under the roof of my house, and I have had an opportunity of paying considerable

attention to them. Each pair of birds has had two broods. Yesterday morning they were at their nests as usual, but there was such a fighting and spluttering I guessed there was something unusual going on; for a long time the old birds kept driving the young ones away from the nests. About eight o'clock in the morning most of the chimney-pots in this part were covered with both martins and swallows; I watched with a glass from the top of my building, and messengers seemed to be sent from each department all round, holding a short conversation with each company: but they did not leave for good, as the morning was foggy, and it did not clear up nicely, but the fog hung about all day, with a slight sunshine occasionally. The next morning came bright and clear, with a north wind, rather inclining to the east; both martins and swallows were early at work paying hasty visits all round: I got on the top of the house with my glass, and I could clearly see about fifty chimney-pots with martins and swallows on them, and also a great number on the telegraph-wires. By eleven o'clock in the day not a martin or swallow was to be seen, and I have only seen two straggling house martins since, and they appeared weak and sickly. I must remark one thing in particular, not a sand martin could I see among the lot, although there are so many breed in the neighbourhood, but it is and has been my opinion that this species leaves earlier. I took rather particular notice of the departure of the swifts, and the sand martins left soon after; I wished them all a safe journey and a happy return.

OCTOBER, 1873.

9th. This morning was very mild and muggy, with a westerly wind, no sun. About a quarter before seven o'clock I observed close to the church, on the telegraph-wires, two old swallows and five young ones; they appeared to be very comfortable. I noticed that the tails of the young ones were very short, which showed they had not long been out of the nest.

13th. This morning at seven o'clock, the weather being tolerably warm, although the wind was nearly north, I saw, in just the same spot as the above twenty-four house martins, all perched on the telegraph-wires, pluming themselves, ready for a start I supposed: I went by the same spot half an hour after, and they were still there, but getting very noisy, as the sun was just breaking through the clouds.

14th. This morning at seven o'clock the sun was shining beautifully, and I saw eleven or twelve house martins flying round about the church steeple; all appeared to be in pursuit of insects, some as high up as the weathercock, which I should think is eighty or a hundred feet high; I have not seen one since. The wind was north-west when I saw the martins, which was about favourable for leaving.

29th. The first fieldfare was seen this day on the Pease Marsh, between Godalming and Guildford.

WILLIAM STAFFORD.

Godalming, October 29, 1873.

The Relation between the Colour and Geographical Distribution of Birds. By ROBERT RIDGWAY.*

THE July number of the 'Naturalist' contains a criticism of my paper on the relation between colour and geographical distribution of birds,† which is doubtless by this time familiar to the readers of this journal. The tone of this criticism renders it necessary for me to reply to it: but in doing so I shall endeavour to use as little space as possible, and limit my defence to the statement of a few simple truths, which I hope will answer the purpose as well as a lengthy discussion.

The specific charges made against me are two in number: (1) I am accused of "appropriating Mr. Allen's work without acknowledgment" to the latter author; and (2) of dishonestly claiming originality in the conception of certain laws and of cases illustrating them. These charges are preferred severally in the following words:—"He writes as if his views were both novel and original, which is not the case. To speak plainly, the paper is based entirely upon Mr. Allen's views, without the slightest allusion to this author; and is illustrated chiefly by cases already published, yet without proper references."

* Reprinted from the 'American Naturalist,' September, 1873.

† "On the relation between Colour and Geographical Distribution in Birds, as exhibited in Melanism and Hyperchromism." Art. Journ. Sci. iv. Dec., 1872, p. 454; v. Jan., 1873, p. 39. [I trust that the references to this and other papers cited in the course of Mr. Ridgway's reply, as well as the critique to which it especially refers, will induce my readers to obtain a sight of all these productions: although the subject is one of such great interest, it is impossible to make room for their reproduction in the 'Zoologist.' The tendency of all these papers is indicated in the Reply here reprinted.—Edward Newman.]

As regards Mr. Allen's work, I am not only willing, but desirous, that he should receive all the credit due to him for his well-accomplished task of elucidating the laws of climatic colour-variation, and geographical distribution. This gentleman's writings place him in the foremost rank of the philosophical ornithologists of the present day, their high merit and great importance being recognized by all to whom they are familiar. I have the highest respect for Mr. Allen's works; they show careful study, deep thought, persevering search for facts, and thorough, analytical mode of treatment. About their only fault consists in the too frequent evidence of conclusions "jumped at," or based upon insufficient evidence.

But as justly as Mr. Allen deserves his high position among the most thorough and advanced ornithologists of the day, we must not lose sight of the fact that he is not the only one who has written upon the subject of climatic colour-variation and geographical distribution. Professor Baird, the pioneer in this subject, so far as America is concerned, first made known the main governing laws, and thus opened the way to later researches. But even he is preceded by Dr. Gloger, who anticipates *all* American writers in many generalizations of this kind, published as long ago as 1833.*

A few of Dr. Gloger's generalizations, which bear more directly upon the province of this paper, are the following:—

"The variation in colour of birds from one country to those from another, is influenced not only by the mean temperature of the year, but also by that of single months (those about the time of the most rapid growth or moult) *and by the relative time and quantity of the falling snow and rain.*" "Light also has influence"—in the change of colour. "Heat has influence by drying out the moisture, whereby the action producing a change is a mechanical one." "The fact that in some summers there are more cuckoos of a reddish brown colour, or with reddish brown spots, may probably be owing to the general or periodical atmospheric constitution of the year in question."

In 1866, before the appearance of any of Mr. Allen's writings, Professor Baird published a paper entitled "The Distribution and Migrations of North American Birds,"† in which much was said

* "Das Abändern der Vögel durch Einfluss des Klimas." By Dr. Constantin Lambert Gloger, Breslaw, 1833.

† 'American Journal of Science and Arts,' Vol. xli., Jan. and March, 1866.

regarding climatic variations in colour and proportions. The generalizations advanced in this paper are the following:—

1. Latitudinal and altitudinal variation in size of resident species; northern bred individuals, and those born at high elevation, being larger than those born further south or in the low lands.

2. Absolute increase of the size of the bill, even with diminution in general bulk, in Florida birds, as compared with individuals of the same species born north of that peninsula: the same rule applying, to a less extent, to birds from Cape St. Lucas.

3. Longer tails of western birds than of eastern examples of the same species.

4. Darker colour of birds from the Pacific coast than of specimens of the same species from the interior, "the latter frequently exhibiting a bleached or weather-beaten appearance, possibly the result of greater exposure to the elements, and less protection by dense forests."

Here then are three laws of climatic or regional variation in size and proportions, and two of colour, in which Mr. Allen is anticipated by Professor Baird. But without going farther into the literature of the subject, I will proceed at once to discuss Mr. Allen's celebrated work published in 1871,* in order to show wherein he has anticipated me in the announcement of generalizations, in cases illustrating them, or in reducing specific names to the rank of race, or "variety," names. On p. 235, the law of increased intensity of colour to the southward is announced, this not having been especially noted by previous writers (though Gloger says something indefinite in relation to it in his work above cited). This law, then, originates with Mr. Allen. The cases which he cites in illustration are the following:—*Quiscalus purpureus*, *Agelaius phæniceus*, *Ortyx Virginianus*, *Sturuella* "*Ludoviciana*" (= *magna*), *Galeoscoptes Carolinensis*, *Harporhynchus rufus*, *Centurus Carolinus*, *Picus pubescens*, *P. Gairdneri*, *Colaptes auratus*, *Thryothorus Ludovicianus*, *Troglodytes ædon*, *Geothlypis trichas*, *Pipilo erythrophthalmus*, *Buteo lineatus* and *Bucephala Americana* (!). The idea of "the so-called *Bucephala Islandica* being the larger northern type of *B. Americana*, in which the white markings on the head and wings occupy a somewhat larger area,"

* 'Bulletin Mus. Comp. Zool.,' Cambridge, Mass., ii. 1871. Part III. "On Individual and Geographical Variation among Birds, considered in respect to its bearing upon the Value of certain assumed Specific Characters," pp. 186—250.

is entirely erroneous, as every one acquainted with these very different species will admit. The other cases cited show only slight (sometimes inappreciable) manifestations of this law within the territory of the United States. Thus none of my cases were "already published," and, besides, all were in a new geographical field.

The laws of variation with longitude, which Mr. Allen lays down, are the following:—

1. Brighter colours of the birds from the interior, than of those from the Atlantic States; with a tendency to more ferruginous tints in some species and to melanism in others.

2. Brighter or darker colours of the birds from the Pacific coast (especially north of the 40th parallel) than of those from the interior.

3. Lighter colours of birds from the arid, sterile plains than of those from either the eastward or the westward.

By referring to this paper, it will be seen that all the above laws are substantially the same as in the generalizations made by Professor Baird in 1866, so that they were at the time of the publication already "the common property of ornithologists;" while the proposition that red areas "spread," or enlarge their field in proportion as we trace certain species towards the Pacific coast, and that in the same proportion yellow often intensifies in tint, is a law of which Mr. Allen makes no mention, and which is, so far as he is concerned, original with me; at the same time I claim originality for the cases illustrating both this and the foregoing laws, though I have never thought before of claiming either the generalizations or the examples as discoveries of my own.

Having given my defence as far as Mr. Allen is concerned, I shall now attend to the cases in which I reduced previously recognized "species" to the rank of geographical races, or "varieties," "the implication being, that such nomenclature, and the views sustaining it, are novel." Dr. Coues professes to have anticipated me in several of these cases by using the same nomenclature in his "Key," and other previous works. How far he is justified in this it is my purpose to show.

The case of *Chrysomitris*, Dr. Coues claims to have "first worked out, in 1866 (Proc. Phil. Acad., 81), exactly as it is here presented, although *C. psaltria* was not there formally brought into this connection, as it has since been by us (Key, Oct., 1872, 132, 133)." How much Dr. Coues is entitled to make this assertion

may be judged from the following summary of his views, as expressed in the first work to which he calls attention:—

138.* *Chrysomitris* (*Pseudomitris*) *psaltria* (*Say*) *Bonap.*

139. *Chrysomitris* (*Pseudomitris*) *mexicanus* (*Swains.*) *Bonap.*

[A. *Var. mexicanus*, *Swains.*

B. *Var. columbianus*, *Lafr.*

C. *Var. Arizonæ*, *Coues.*]

Dr. Coues' reasons for keeping *Psaltria* apart from *Mexicanus* and its varieties are explained by his own words, which we quote from p. 83 of the first paper cited:— . . . “the typical *Psaltria* is so very diverse from *Mexicanus* proper, and the doubtful specimens” (meaning *var. Arizonæ*) “incline so very decidedly toward the latter, that, in the impossibility of uniting *Psaltria* with *Mexicanus*” (!!!) “we must consider them” (the doubtful specimens—*var. Arizonæ*) “as varieties of the latter, unless, indeed, they be hybrids between the two.” Thus it is very plain that *C. psaltria* was not then formally brought into the connection in which I placed it. My arrangement of these forms was as follows:—

Chrysomitris psaltria, *Say*.

a. *Var. psaltria*, *Say*. Rocky Mts. of the U. S.

b. *Var. Arizonæ*, *Coues*. U. S. and Mexican boundary.

c. *Var. mexicana*, *Swains*. Mexico and Central America.

d. *Var. columbiana*, *Lafr*. Isthmus of Panama and adjacent localities.

In discussing the relationship of these forms to one another, Dr. Coues does not even note the progressive increase of black from *Psaltria* to *Columbiana*—much less does he appear to consider the manifestations of any climatic law affecting colour as applicable in this case—but merely gives the comparative characters of the several races, and remarks, incidentally that there is a gradual transition between the two extremes (*Columbiana* and *Arizonæ*—*Psaltria* being positively separated from the series, as a distinct species, in the manner shown above). As regards “bringing it into the connection” of a race along with *mexicanus* in the “Key,” Dr. Coues may, perhaps, remember the occasion upon which I explained the case to him, illustrated it by a series of specimens, and discussed the matter with him without hesitation.

In the treatment of the races of *Myiarchus Lawrencii*, I certainly cannot be justly charged with “scientific plagiarism,” since I

* The current number of his catalogue.

present the case in an entirely different light from Dr. Coues, as the following schemes of arrangement will show:—

(Coues' arrangement).

6. *Myiarchus Lawrencii*.
Tyrannus Lawrencii, Giraud. } Syn.
Myiarchus nigricapillus, Cabanis. }
 7. *Myiarchus nigriceps*.
Myiarchus nigriceps, Sclater. } Syn.
 „ *brunneiceps*, Lawr. }

(Ridgway's arrangement).

1. *Myiarchus Lawrencii*, (Giraud).
 a. *var. Lawrencii*, Giraud—N. Mexico.
 b. *var. nigricapillus*, Caban.—S. Mexico
 and Central America.
 c. *var. nigriceps*, Sclater—Panama to
 Ecuador.

Each of the three races which I recognize is characterized by perfectly tangible distinctive features; *var. nigricapillus* is well marked by conspicuous characters which distinguish it from both the others, notwithstanding that Dr. Coues “cannot make out that it is even a “recognizable variety.” The simple fact that in the series I recognize but one species, with three geographical races, and apply scientific principles in showing the gradual transition from one extreme to the other, and at the same time show the direct relation between this progression and a certain climatic law of colour-variation, while he recognizes, in effect, two species, without any varieties, and does not discuss any law or generalization at all, shows how unjust are his pretensions to have anticipated me in this case. These pretensions may, perhaps, be considered the more unjust from the fact that the material upon which Dr. Coues based his monograph of this genus had been previously overhauled by me, thus giving him the benefit of my unpublished determinations, which were in many cases indicated upon the labels—though it is but due to Dr. Coues to say that he acknowledged in one case the source of his information.

I do not claim originality for calling *Picus Harrisii* “*Villosus var. Harrisii*,” but merely—as any one can see—cite it as an instance illustrating increased melanism toward the Pacific coast. For calling *Sphyrapicus ruber*, “*Varius var. ruber*,” however, I do claim originality, notwithstanding the fact that this way of “putting it” was first done in the “Key.” I well remember, though perhaps Dr. Coues may not, the occasion upon which I unhesitatingly told him of my discovery, and satisfied him of its merit by laying out a series of specimens to illustrate my theory. At that time he certainly had not thought of combining *S. ruber* with *S. varius*, as a geographical race, along with *S. nuchalis*, but the length of time elapsing before the publication of the “Key” (perhaps a year) no doubt justifies his lack of recollection as to how he got the idea.

The statement in regard to *Cardinalis* is erroneous in several respects: first, I did not make "a new Mexican variety, *carneus*, of *Cardinalis virginianus*," but gave the synonymy of that previously named race, citing Lesson first, and Bonaparte's *Conspectus* next, as authorities for the name, which I merely reduced to the rank of a race. The new race which I characterized was *Coccineus Ridgway*, from eastern Mexico, while *Carneus*, Lesson, was from the western coast. In reducing *C. igneus*, of Baird, to a variety, I did not follow "a previous writer" (Key, p. 151 cited) since, as explained further on, I had not seen the "Key" until after the printing of my paper.

In the case of the western forms of *Cyanura* I am perfectly willing to renounce all claims to originality; for if my method of treating them contributes to the better understanding of the relation which they bear to each other, my aim is accomplished.

So far as Dr. Coues' "Key" is concerned in the matter of nomenclature, it must in this instance be ignored, as the following facts justify:—though the "Key" was published in October (1872) and my papers not until December and January following, yet I never saw the pages of that work until after the issuing of my papers, which were written and forwarded to the publishers the preceding July or August, at which time I had not seen the "Key" at all. Even had I seen and been perfectly familiar with its pages, I could still claim with perfect right, for reasons stated farther on, originality for the nomenclature which I used.

And now, having justified myself in regard to the relation which my paper held to previous publications in specific points, let me say a few words in its defence on general principles. From the time when its preparation was first discussed in my mind to the time of its publication, the question never once occurred to me whether the laws which I endeavoured to explain were my own discoveries, or whether their discovery was the property of others. I took it for granted that the subject and its general principles were so familiar that a preliminary review of its literature would be a superfluous addition to a paper already overburdened with references—of which, very singularly, my reviewer complains of a meagreness. My only view was to begin at once with these laws, state as precisely and briefly as possible what their principles were, and illustrate them, *purely in the interest of science*, by novel cases, and, when possible, by the cumulative evidence of

familiar cases. If I have succeeded in contributing a few unfamiliar facts to the store of science (and the hope that I have is encouraged by the fact that my reviewer has had the courtesy to approve of the treatment of some cases, and to acknowledge the merit of an occasional novelty) I am much gratified, and consider myself well paid for my labours. To be charged with literary theft must be unpleasant even when it is merited; but to be falsely branded with "scientific plagiarism," without any provocation, is an accusation which cannot be borne in silence. In this case, the charge bears with it so much arrogance, that a simple defence against it is not sufficient; and I should consider myself very selfish and uncourteous did I not make some return for the marked attention which I have received. I therefore deem it my duty to state here, that the several examples alluded to above are but a fraction of the number of cases in which I have suffered from my indiscretion of being too trustingly communicative, and from Dr. Coues having taken advantage of earlier means of publication.

Should my reviewer realize the truth of his preliminary remark, that "the critic's office is not seldom ungracious," I am sure that I feel very sorry that he made up his mind not to "shirk the responsibility" in which the tone, more than the matter, of his criticism involved him.

Otter in the Thames.—When fishing near Parkhill Lock, a mile above Eynsham Bridge, an otter rose in the middle of the stream; at first we mistook it for a large fish feeding, but two days later it was again seen at the same spot. It came up close to a man's float. It is supposed to have come down the river from Ark Island, having been disturbed by some people who had been moorhen-shooting.—*A. H. Smee.*

Rats eating Pigs.—A farmer in this neighbourhood (Longparish, Hants) lost eight pigs last winter, about six months old, from rats; during the cold weather, when food was scarce, they nibbled the edges of the pigs' ears whilst they slept, in some cases gnawing them close down to their heads, so that they gradually wasted away and bled to death.—*H. Durnford; October, 1873.*

Ornithological Notes from Suffolk during August, 1873.—

Kestrel.—20th. This afternoon I winged a redshank on "the flats" up the Blythe, from behind the river wall, which fell close to the river; whilst waiting for the boatmen to come down and pick it up, I observed a kestrel

beating over the muds in the direction of my wounded bird ; getting nearer he quickly espied it, and was on it in a moment, and I had the mortification of seeing it carried off in his claws to the other side of the river. Only an hour or so previously I had met with a half-eaten redshank on the wall, which had no doubt shared the same fate as mine, and I subsequently observed a kestrel hawking over the muds evidently searching for wounded dunlins, &c., which being numerous here, doubtless formed a great portion of his diet.

Reeve.—12th. Immature bird on Thorpe Mere to-day.

Green Sandpiper.—11th. Numerous along the ditches at the back of the wall by the river Blythe, generally occurring singly, but I occasionally observed a small party of four or five birds. 13th. Observed several in the ditches by the banks of the river Alde, near Orford ; they are more numerous here than at Southwold. 21st. Counted fourteen birds up the Blythe about five o'clock this morning.

Curlew and Whimbrel.—13th. Large flocks on the pasture lands about Orford Ness ; they are, I believe, all birds of the year.

Dunlin.—20th. Two birds shot at Southwold to-day have commenced their autumnal moult. 21st. To-day my brother shot a dunlin, which is referable to the small race of that species. It was with a large flock, but the others were apparently of the usual size. Mr. Stevenson has kindly compared this bird with those in his own collection, and finds it quite agrees with them, but he tells me they vary in the length of their beaks, *inter se*, in the same way as those of the larger race do. The measurements of my bird are : beak, fifteen-sixteenths of an inch ; tarsus, three-quarters of an inch ; carpal joint to end of first quill-feather, three inches. The beak of the smallest ordinary dunlin in my collection is fully one inch in length.

Razorbill.—13th. Shot a bird of the year to-day swimming in the Alde, about five miles from the mouth of the river ; it seemed exhausted, and made no attempt to escape on our approach, though it was not in such bad condition as might have been expected from meeting with it in such a locality.

Cormorant.—20th. Two birds in Eastern Broad, near Southwold.

Little Grebe.—19th. To-day we caught two young birds, about ten days old, in a ditch at the back of the river wall, near Southwold : they swam both above and under water with the greatest ease. Are not these very late birds ?

Common and Lesser Tern.—11th. Observed several birds, chiefly immature, of the latter species frequently alight in the mud-flats up the river, amongst the ringed plovers. 13th. Visited the extensive tract of shingle at Orford Ness, where the common tern breeds numerously : many birds were still in a partially downy state, and unable to fly strongly ; the head and neck is the last part to assume feathers. After careful examination here on this and some subsequent days I was unable to detect any arctic terns amongst the common species.

Richardson's Skua.—17th. An immature bird on the beach near Dunwich to-day.

Nocturnal Migrants.—On the 13th of September a great flight of waders of some sort took place over Southwold at about half-past seven o'clock in the evening; they were near enough for people who happened to be out at the time to hear the flapping of wings and whistling; it lasted for about ten minutes.—*H. Durnford*.

Notes from Aldeburgh, Suffolk.—August 11th.—I shot a wood sandpiper to-day in the mere; I had for some days noticed several about, and repeatedly heard their note at night. This is the ninth specimen which has come into my possession in the flesh, every one of which has occurred in the month of August. During the last few days of August considerable flocks of waders have made their appearance about the meres and river. I have obtained curlew sandpipers, knots, little stints, immature ruffs, and one adult specimen of the smaller race of ringed plover. Aug. 28th.—Out of five curlew sandpipers which I shot to-day three were adult birds, still retaining a good deal of the summer plumage. Kingfishers are now plentiful about the river, as they always are at this season; I have very little doubt that they are to a certain extent migratory. September 10.—One of my friends shot an adult swift to-day; a late appearance. Sept. 11.—When walking on the promenade to-day between Slaughden Quay and the Brudenell Hotel, a flock of common terns passed me close along shore, and following them I observed a small skua. The following day I walked some miles along shore in search of it, and met with it off Thorpe, under exactly similar circumstances. I got a long shot at it and killed it: it proved to be an immature Richardson's skua. I saw another bird, apparently of the same species, but it kept out of gunshot. A few skuas, both Richardson's and pomarine, are generally met with in the fall of the year, and both are well known among the gunners by a *sobriquet* which is a literal translation of "*Stercorarius*." Mr. Hele's collection contains a mature Buffon's skua, which was shot some years ago from a bathing-machine as it was passing along shore. I have had some conversation with the gunners relative to the new Wild Birds Protection Act: the general opinion on the matter seems to be that while they fully agree with the protection of peewits, wild ducks, redshanks, &c., while breeding, they will sustain a loss by being unable to shoot migratory birds (sanderlings, turnstones, gray plovers, &c.). I find that the idea prevails everywhere that eggs are protected, both by this Act and the Sea Fowl Act.—*Julian G. Tuck; Tostock House, near Bury St. Edmunds, Suffolk*.

Notes from Longparish, Hants.—

Wood Pigeon eating Snails.—On the 9th of August last my brother took ten small fresh-water snails from the crop of a freshly killed wood pigeon. On the 23rd I took a dozen from another bird, and on the 26th two more

from another. These were all of the same species of mollusk, and were amongst quantities of wheat and peas; the birds were all shot near the river Test.

[The rock dove (*Columba livia*) feeds on snails (*Helix Ericetorum*), but I do not recollect a similar record of the wood pigeon.—*Edward Newman*.]

Stone Curlews Feeding at Night.—September 18. Three stone curlews fly regularly every evening about dusk from the higher chalk lands above the river to the water meadows bordering the Test; they are very clamorous.

Green Sandpiper.—August 23. Two birds at the bottom of Barnsbury Common: I observed these birds here on several subsequent occasions; they seemed very partial to a small patch of peaty soil bordering the river.

Rooks eating Acorns.—September 30. The oak trees are full of rooks, which feed upon the acorns; they do not eat them off the ground, but only pick those that are growing on the tree.

Variety of the Sky Lark.—September 6. This evening I shot a very small cream-coloured variety of this species; it is about the size of a small meadow pipit.

Hobby.—August 23. My brother shot an adult male to-day.—*H. Durnford*; October, 1873.

Ornithological Notes from Lancashire (continued from S. S. 3613).—

Ringed Plover.—These birds must have several broods in the year. A nest containing eggs was found near here on the 19th of April; on the 19th of May I found a young bird about a fortnight old; on the 21st of June I found two nests with eggs, and on the 9th of August last year I found young birds still unable to fly.

Common Tern.—June 11. This species has now commenced to lay in numbers about Formby; the birds lay on the tops of the most naked sandhills, choosing those on which the vegetation is most scanty, and from which they can readily see any approaching danger. The full complement of eggs appears to be three, rarely two; they are laid in a slight hollow in the sand, with no nest whatever.

Lesser Tern.—June 7. Found six nests on a bank of fine shingle and gravel, at the Point of Air, Flintshire, containing in most cases two eggs, which seems the full complement, as in no instance did I find more; two of the nests were carefully paved with fine pieces of broken shells, the concave sides inwards. I observed about a dozen birds resting on a pool of water left by the receding tide; I noticed some lesser terns swimming in almost exactly the same place about this time last year. Yarrell records this habit of the lesser tern, and I am glad to be a witness to his accuracy, especially as I have seen his statement doubted.

Shieldrake.—On the 7th of June I disturbed a pair of old birds and five young ones which were resting on the shore under a bank of shingle; the female feigned lameness immediately on seeing me, whilst the young ones,

certainly not more than ten days old, plunged boldly into the sea, although it was anything but smooth at the time, and they had great difficulty in getting beyond the break of the waves. Both old birds subsequently settled on the water close to them, and I watched the family party swimming along shore with the tide till out of sight. A young bird I caught was a beautiful little ball of down: head above dark brown, with a line of that colour running down the back of the neck; sides of head, throat, neck, chest and stomach snowy white; back dark brown and white, evenly distributed in patches. When I handled it, it uttered shrill piping notes, resembling a good deal the cry of the oystercatcher when its nest is threatened with danger.

Dunlin.—July 16. Observed several small parties, chiefly young birds, in the sandy flats near the mouth of the Mersey, mostly very tame. By the 28th they had returned from their breeding quarters in force, and now associate with the ringed plovers.

Sanderlings.—July 31. Very numerous on our flats, occurring in even larger flocks than the dunlins; they like drier situations than those birds, frequenting the sand-banks rather than the mud-flats.

Lesser Tern.—July 1. Again visited the Point of Air, and found there had been a large arrival of lesser terns since my visit on the 7th of June. I found nine nests in about half-an-hour, which in nearly all cases were paved with pieces of broken shells. Eggs generally two; in some few cases there was a single one, which was considerably incubated. I think it probable that from the frequent robbing of nests here the birds get so exhausted that they are unable at last to lay more than a single egg. They were extremely bold and fearless, returning to their nests almost as soon as my back was turned.—*H. Durnford; Waterloo, Liverpool, September 18, 1873.*

Ornithological Notes from Tamworth.—

Wheatear.—This year we have had many more wheatears than usual.

Pallas' Sand Grouse.—A friend of mine has a Pallas' sand grouse which was shot at Swinfen, near here, in 1866, three years after the great flight recorded in the 'Zoologist.'

Late breeding of Martins.—A pair of house martins here are just bringing off a nest of young ones; they left the nest for the first time on the 10th of October. A hen house sparrow seems to take as lively an interest in their welfare as I do, for on most mornings she pays the nest a visit, flying up against it and peeping in.—*Egbert D. Hamel; Tamworth, Oct. 13, 1873.*

Birds observed at St. Michael's-on-the-Wyre.—At St. Michael's-on-the-Wyre, North Lancashire, during the past month or two, snipes visited us in some abundance, though not nearly so plentiful as last year. The heaviest we killed weighed four ounces and three-quarters, on the 8th of September, a redder-plumaged specimen than usual, though I think a real

Scolopax gallinago. On the 22nd of September we killed on the snipe-ground—a mile from us, and thirteen miles from the coast,—a blacktailed godwit (*Limosa ægocephala*). Total length, sixteen inches; tarsus, three inches; bare portion of the tibia, one inch and three-quarters; bill, three inches; weight, ten ounces. A day or two later my brother wounded a solitary snipe (*Scolopax major*), which after a long hunt we found, having marked it down some hundred and fifty yards off; it weighed only six ounces. Length, eleven inches; bill, two inches and a quarter. It lay very close, and uttered a note not unlike that of the common snipe on rising, when we immediately saw that it was a stranger to us, owing to its entirely different flight,—heavy, slow, and straight away. The first *Scolopax gallinula* was shot on the 29th of September. A scaup (*Fuligula marila*) we secured on the Wyre on the 10th of October, about nine miles from the sea. It was by itself, and easily approached, but on being winged astonished us by its diving powers. Three of apparently the same species regularly haunted some flooded meadows in our neighbourhood for a week or ten days. On the 11th of October we shot our first golden plover, in winter plumage. A few quails (*Coturnix vulgaris*) annually breed with us, and are always to be found within a few yards of the same field. Rather more plentiful this season than of late years. They rarely rise in bevies, but singly; on the 12th of October, however, our retriever flushed a bevy, containing about ten birds. The spotted crane (*Crex porzana*) again was in our part of the country: a young bird was accidentally shot in September, and on the 15th of October I and my retriever caught two, one a young and the other an old bird, alive, but set free again. They show great repugnance to flying, preferring to trust to their legs, running very quickly and low, and looking more like rats than birds. Even when liberated in open ground, the two I caught refused to fly, though quite free from injury. On being placed in some shallow, clear water, they immediately dive, staying below the surface a considerable time, occasionally using their wings until a rushy patch be found, in which they creep, and remain as long as possible, when they raise their heads, but no more out of the water.—*Hugh P. Hornby*; 35, *Norfolk Street, Strand*.

Note on Rare Birds obtained near Flamborough Head.—I have seen a beautiful specimen of the Sabine's gull, apparently a bird of this year, which was killed near Flamborough Head on the 15th of October by Mr. Matthew Bailey, who I am informed also obtained three little gulls and saw a greater shearwater all about the same date and in the same locality.—*J. H. Gurney*; October 24, 1873.

Peregrine near Scarborough.—On the 30th of September a young specimen of the peregrine falcon was shot at Cayton Waterworks, near Scarborough. The bird has been sent for preservation to Mr. Alfred Roberts; it had just been feeding on a rock pigeon.—*T. Beck*; *Scarborough*.

Note on the Cirl Bunting.—The cirl bunting is a common bird generally in Cornwall, and particularly so in the neighbourhood of Penzance. Its nest has often been found, and I think that the localities chosen are pretty similar to its congener, the yellow bunting. The markings of the eggs are very similar in character to the other bird, but the colour of the markings is very different; those in the yellowhammer are always, as far as I have observed, purplish red, but in the cirl buntings they are almost, if not quite, black. The cirl bunting, in the late summer and early autumnal months, remains concealed in the large trees, amidst the foliage; there its song may be constantly heard. In fact, its habits generally are far more recluse than those of the yellowhammer, but it every now and then may be seen on the open sprays. Its most usual song is the jabber of the yellowhammer, but without the prolonged note at the end; when concealed in the foliage of trees its song is often more sibilous and rapid in delivery, and at a distance sounds not unlike that of the wood wren (*S. sibilatrix*), but stronger in expression.—*Edward Hearle Rodd.*

Curlew Sandpiper, Ruffs and Reeves, &c.—Noticing Mr. Cordeaux's account of the curlew sandpiper and its habits on the Great Cotes marshes in the last number of the 'Zoologist,' I may mention that that species has appeared here also (on the shores of the Firth of Forth) in unusual numbers this autumn. So also have ruffs and reeves, both adult and young, which are generally scarce here at the time of the autumn migration. Little stints have also been procured, though not in any number, and we hear of *Tringa Temminckii* having been obtained at Donmouth, in Aberdeenshire; also specimens of green and wood sandpipers.—*J. A. Harvie Brown; Dunipace House, Falkirk, October 1, 1873.*

Greenshank and Common Tern in Oxfordshire.—On the 15th of August, when rowing up the Thames from Oxford to Eynsham, I put up a greenshank which was feeding with eight or nine common sandpipers in a shallow. The same afternoon I flushed a couple of snipe, and on the following Sunday I saw a young tern fishing and dashing itself into the river.—*A. H. Smee.*

Large Sturgeon in the Ouse.—It may interest some of your readers to know that a fine sturgeon was caught on the 10th of September in the river Ouse, which runs through this parish. It had been known to have taken up its abode in a deep pool in one of the back-waters for some time before any attempt was made to net it. Captain Douglas, the Lord of the Manor, gave orders for its capture, and after two attempts it was secured; the first time it succeeded in jumping over the net. Its extreme length was seven feet two inches and a half; length, from tip of snout to fork of tail, six feet five inches and a half; greatest girth, twenty-six inches. Weight, ninety-

eight pounds. According to its length it ought to have weighed heavier, but it was rather out of condition, though its flesh ate well,—something of a mixture of eels, veal and chicken. This makes the third sturgeon which has been caught in the same pool; the largest, caught some five years ago, weighed one hundred and twelve pounds.—*J. H. White; Hemingford Grey, St. Ives, September 21, 1873.*

Death of the Porpoise in the Brighton Aquarium.—I regret to state that the last surviving porpoise at Brighton is dead. This is not merely to be lamented as a loss to the aquarium, but as proving how difficult it is to keep the Cetacea in confinement, for we cannot doubt that every care has been taken with these most interesting prisoners.—*Edward Newman.*

The Supposed Sea Serpent.—On Tuesday afternoon last, Lady Florence Leveson Gower and the Hon. Mrs. Coke, driving near the sea, about eight miles east from Dunrobin, saw what seemed to them a large and long marine animal. On Wednesday morning Dr. Soutar, of Golspie, saw a large creature rushing about in the sea, about fifty yards from shore: it frequently raised what seemed a neck, seven feet out of the water, and from the length of troubled water behind it appeared to be fifty or sixty feet long. He said to his family on meeting them at breakfast, "If I believed in sea serpents, I should say I had seen one this morning." I may mention that this gentleman is a most trustworthy observer and cautious man. On Thursday I saw what seemed some drift sea-weed. When your report was published Dr. Tayler, the author of 'Thanatophidia of India' was at the castle; I asked him what he thought of the matter, and he said he was quite prepared to believe in such a monster. Mr. Vernon Harcourt told me that he was in a small yacht off Glenelg on the evening of the day mentioned in your report, and about six miles from the locality, and that he and his crew saw what seemed a great moving mass, which, but for some engagement or the lateness of the hour, they would have examined.—*Extract from a letter from Mr. Joass, of Golspie, to the Rev. John Macrae, of Glenelg.*

[Mr. Joass, an eye-witness, writing in the 'Times' of November 20, says, "the ears seemed to be diaphanous and nearly semi-circular flaps or valves over-arching the nostrils, which were in front. The cavity of the eye appeared to be considerably further back, and a peculiar glimmer in it, along with the sudden disappearance of the creature, presented, indeed, the only signs of its vitality, so far as I could see, while I watched it for half-an-hour, apparently drifting with the rising tide, but always keeping about the same distance off shore. * * * Dr. Soutar and I are more or less familiar with the forms of the porpoise, seal, halibut, conger, and even shark, both in and out of the water."—*Edward Newman.*]

